

# Project Deliverable D: Conceptual Design

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Team Name: GreenAR World



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# 1 Introduction

Based on our team's problem statement, benchmarking and the list of prioritized design criteria, each team member in our group will come up with 1 idea per subsystem for our application GreenAR World. As individuals, we will have a chance to come up with our own ideas and reflect upon what the application must do to be successful. Since we are working to make an application and not a physically working system, we will be coming up with ideas on how each menu in our application will look like and how it will operate. We will then come together for a chance to discuss and present our own ideas to the rest of our group members at one of our group meetings. We will give each other feedback then continue to categorize, condense, combine, refine and reconsider each subsystem concept. Each of our ideas will be accompanied by illustrations in order to easily visualize one's idea. Each idea will be considered and ranked based on a majority voting system. As a group we will come to a consensus of which subsystems are superior and combine them to finally make 3 fully functional solutions. As we did in lecture 6, we will use a selection matrix to determine which functional solutions are best based on a points system. Finally to conclude this deliverable, we will discuss why we have discarded some of the subsystem concepts and why we ultimately chose the ones that we did.

## 2 Subsystems Concepts:

For our group, all concepts and subsystems were very similar if not the same so we have categorized each group member's idea by a screen/menu. In this section of deliverable D, we as a group decided that we would present our own idea for each subsystem for one overall concept. Since this is an application and the menus/features are pretty standard to begin with, we think it is acceptable to present our ideas this way. We have tried coming up with multiple concepts and subsystems but they were too similar to be able to compare them fairly. We are also doing this project while in quarantine, never being able to see one another so splitting the ideas up this way was easier and more clear for all of us. We will then give each member a chance to present their ideas and we will discuss what we have come up with for each subsystem. The selection matrix will be utilized for each subsystem to determine which features are superior to others for each screen/menu. Based on the selection matrix, we will see what elements we would like to keep, what elements we would like to discard and what elements we would like to add.

### 2.1 Introduction Screen

The introduction screen is a short boot screen that will be displayed shortly just before the main screen loading.

#### 2.1.1 Branden Leung

When you first open the application, the user will be greeted with a boot up screen. This screen will be aesthetically pleasing and provide information regarding the loading percentage. Also, it will have our GreenAR World logo in the middle of the screen. After loading the introduction screen, the application will automatically go to the main menu screen.



Advantages:

- Colourful screen
- Showcases logo
- Simple design

Disadvantages:

- Loading bar is not relevant/not needed

### 2.1.2 Ethan Leung

When opening the application, the introduction screen will display today's date, with the GreenAR World logo, followed by a spontaneous fact about recycling or the Earth. The background will consist of either a translucent view from the camera, or a light green background with moving objects that are representative of recycling. A start button will be located in the lower region of the introduction screen that will forward the user to the main screen.



Advantages:

- Colourful screen
- Showcases logo
- Simple design
- Start button is standard, simple and user friendly

Disadvantages:

- Interesting fact is redundant
  - Might be hard to implement when creating application

### 2.1.3 Monica Harada

Upon opening the application, the user is greeted with the application's logo when loading followed by a recycling fact. To close the recycling fact and to start the AR application, there will be a start button on the screen. The application can include a green and blue colour palette to make the application more visually appealing. After clicking the start button, the user will be led to the main screen.



Advantages:

- Colourful screen
- Showcases logo
- Simple design

Disadvantages:

- Recycling fact not needed
- Design in background too busy

### 2.1.4 Keera Moretti

The introductory screen is the first screen that users see when opening the app. The design is minimalistic; with the GreenAR World logo in the middle and a slogan at the bottom. Once the app is

fully loaded, a user need only press the 'start' button to enter. Alternatively, the start button could be a 'log in / sign up' button.



Advantages:

- Simple design
- Showcases logo
- Simple slogan
- Calming effects

Disadvantages:

- May be too simple/boring, not engaging or “fun” looking to user

### 2.1.5 Alexander Fournier

When the application is first being booted up our logo appears in the center with a slogan referencing recycling. Perhaps the rest of the screen surrounding the logo is in some way appealing to grab the consumers attention. Could also maybe show helpful tips instead of a slogan to help users understand features they may not know about.

Advantages:

- Colourful screen
- Showcases logo
- Simple design
- Simple slogan
- Screen is engaging and grabs user’s attention

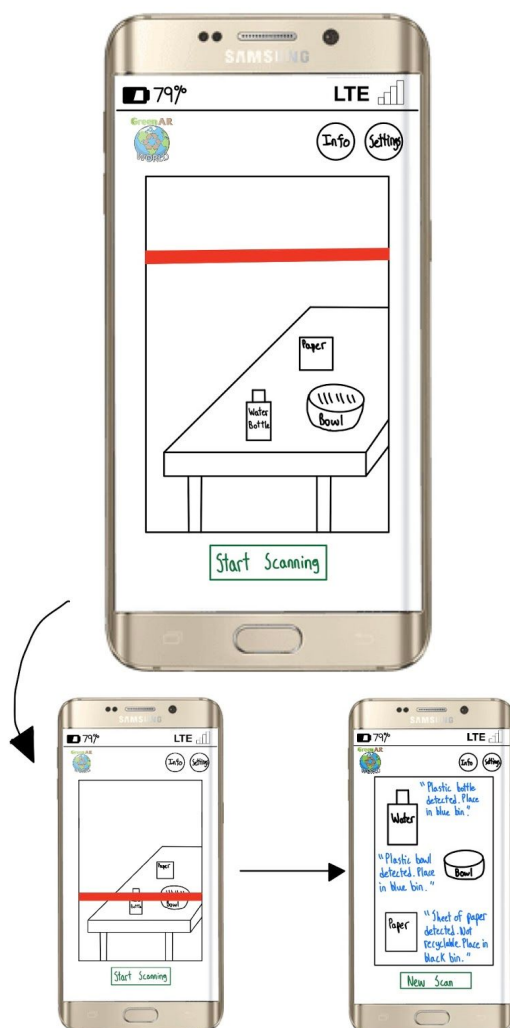
Disadvantages:

- None

## 2.2 Main Screen (Using AR to scan and identify)

### 2.2.1 Branden Leung

On this screen, the application will have a main menu button before entering the recycling item screen. The user will have to press the button called “Start Scanning” to begin scanning the item using their smart device’s camera. If they do not click the start button, other options such as tips will be on the menu as well as the settings button. Once the individual clicks the start button and the scanning stage has opened, the user will be able to see items within the camera view. The application will have a red line going across the screen to demonstrate it is indeed scanning the item. At the right hand corner of the screen, it will have a button for the information menu.



Advantages:

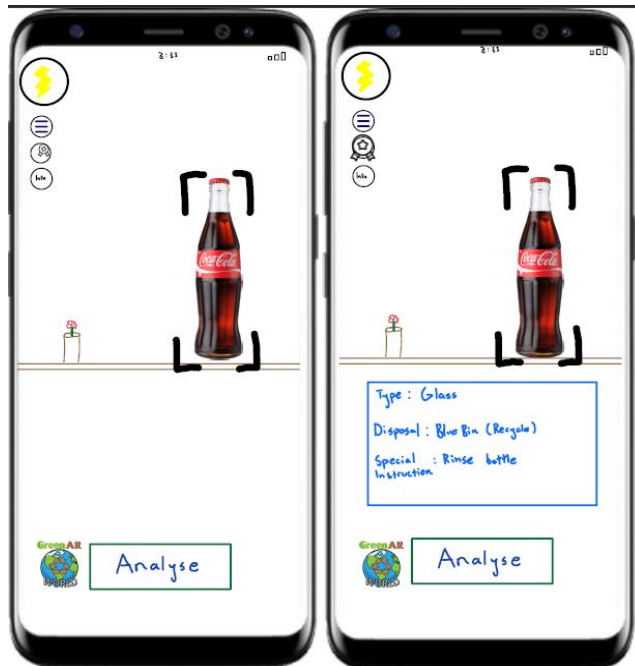
- Clean looking screen
- Scanning bar to indicate the application is indeed scanning the item

Disadvantages:

- Buttons for settings and info are hard to find
  - May affect user friendliness
- Item categorizing is too wordy, user may not find application useful

### 2.2.2 Ethan Leung

The main screen will be able to identify objects within the camera's point of view. The majority of this screen will be dedicated to this section. Object's will automatically be identified, with a button below titled "Analyze" to retrieve the disposal information. Besides this main identification component, the top left corners will house a flash option to operate in low light conditions, an internal settings menu access icon and the points system icon.



Advantages:

- Flash feature
- Small menu options, does not overwhelm screen
- Item identification

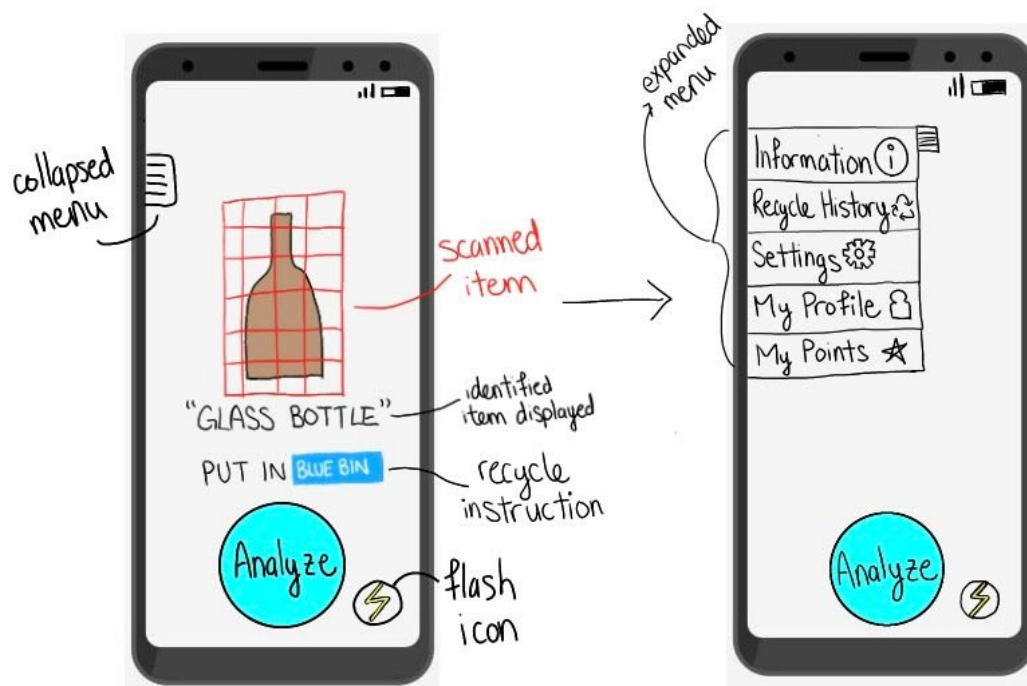
Disadvantages:

- Logo beside analyze is not relevant, looks out of place

### 2.2.3 Monica Harada

The main screen will in real time show what the smartphone's camera is seeing. The main screen will feature an "Analyze" button which will prompt the application to scan the recycle item(s) in its view. It will also include a flash feature so the application can work at any time of day and in any environment. The main screen will have a button which has all the menu options collapsed. The user is free to open this menu at any time to go to the information/recycling history screen, setting menu, and points menu.





Advantages:

- Flash feature
- Item identifier is good
- Collapsible menu
- Identifier is a good feature

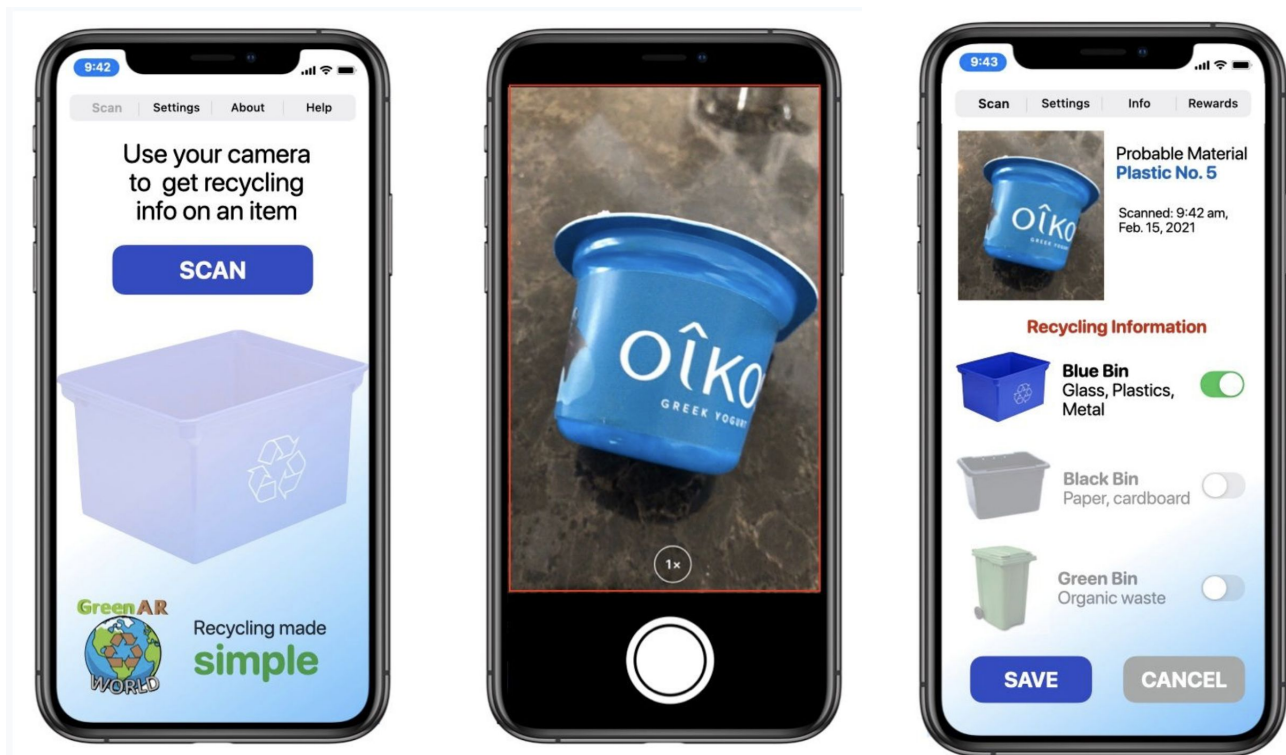
Disadvantages:

- Analyze button too big
- Cluttered when giving user recycle information

#### 2.2.4 Keera Moretti

Once the user enters the app through the introductory screen, they are greeted by the home screen. The home screen is the core of the app, where you can access all tabs including 'scan', 'settings', 'about', and 'help'. To access the AR functionality, users simply need to press the large 'SCAN' button located in the middle of the upper half. This will take you to a very simple screen which resembles the camera application. Users need to point the camera at the item which they would like to scan and then press the large white circular button. For simplicity, there is only one button available, making the AR functionality very intuitive even to the most inexperienced user.

Once the item is scanned, the app will automatically take the user to the next screen which identifies the item and selects the bin in which the item should be placed. If the item cannot be recycled, none of the options will be selected and "Cannot be Recycled" will appear in large red letters over the options. If recyclable, the user can then 'save' this item to collect points for recycling, thereby logging the item, or they can cancel. Both buttons will prompt the app back to the home screen.



#### Advantages:

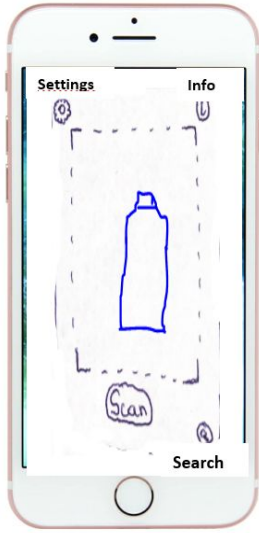
- Clean design
- Menu location is good
- Informative screen
- Time stamp
- Reward feature
- Camera screen is simple and not cluttered

#### Disadvantages:

- No way to get from camera screen to other menus
- Getting asked to log points might be tedious

#### 2.2.5 Alexander Fournier

When the app is loaded a screen appears with the view of your phone's backside camera. Ontop of being able to see what the camera is seeing there is a big button on the center bottom which can be used to "scan" an item. In the upper right corner and upper left corner, two smaller buttons will be fainted in colour but still visible. One of these buttons can be clicked to access the applications "settings" while the other one can be used to access some sort of information or help screen. In one of the bottom corners there's another small button that allows you to search up the item you are trying to scan in case the scanning does not work.



Advantages:

- Large button for analyzing item
- Search button in case item is not scannable
- Simplistic design

Disadvantages:

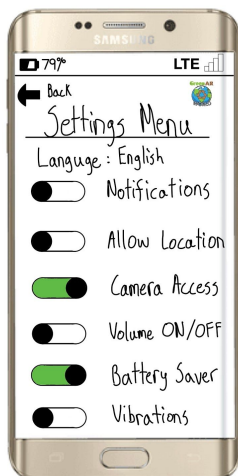
- Not as appealing to consumers

## 2.3 Internal Settings Menu

Concept ideas about what should or may be included in the internal settings menu.

### 2.3.1 Branden Leung

In the settings menu tab, it will have buttons such as tips and tricks, user privacy settings, customer support (help), ability to turn on or off location settings for this app, and volume settings for this application. It will also have a button where you can click to view the rewards point system.



Advantages:

- Simple user interface
- Large buttons which are easily identifiable
- Large text

Disadvantages:

- Do not need the vibrations button

### 2.3.2 Ethan Leung

Within the internal settings menu, multiple functions will be listed and available for use. A tutorial button will be available, which will guide the user through the basic fundamentals of the app. A permissions section with location and camera settings. A language selector will also be available for the users. Device options will be available such as device vibrations and a mute switch.



Advantages:

- Tutorial button on how to use the application
- Clear titles

Disadvantages:

- Lack of setting options
- Plain screen (not as appealing)

### 2.3.3 Monica Harada

The internal settings menu will include customizable settings for each user. The settings menu will include a help and support link, notifications on/off and location permission settings to identify the correct recycling regions. The settings menu will also ask users if camera/photo access is allowed from the application to their device.



#### Advantages:

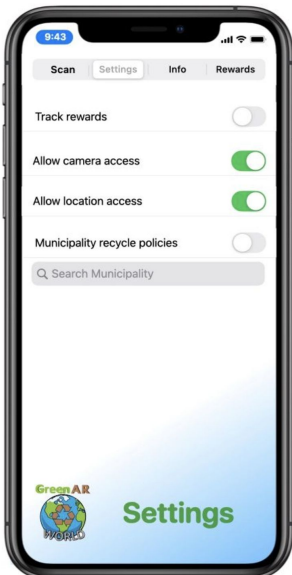
- Large text and easy to read for user
- Large buttons
- Customer help and support option available
- Drop down menu for languages

#### Disadvantages:

- Limited settings options

#### 2.3.4 Keera Moretti

The settings menu is quite simple and allows users to decide if they would like to track their recycling and collect points, it also allows them to look up and select their municipality so that the app can provide the most accurate information possible. Furthermore, the user has the option to 'allow camera access', and 'allow location access'. The 'allow camera access' must be selected for the app to function properly.



Advantages:

- User friendly settings screen
- Availability of municipality recycle policies
- Potentially add two-map in empty space

Disadvantages:

- Not as physically appealing to younger audiences

### 2.3.5 Alexander Fournier

Internal settings can include allowing the user the option if it would like the application to use its gps settings for certain features. Also we can include an option if users would allow us to save information on what they recycle and popular items in order to better our application. If profiles are made within the application then this is also where username and password settings can be changed. If being used across the world then also add language translation options.



Advantages:

- Ability to save information regarding which items the user has recycled
- Information sharing button

Disadvantages:

- No GreenAR World Logo

## 2.4 Information Menu

Ideas surrounding about what kinds of information should be included in this menu, i.e, statistics,

## 2.4.1 Branden Leung

For the information menu screen, the user will have to find the button for this item in the right hand corner of the main screen. This screen will include information such as definition of recycling, different symbols of recycling, the type of recyclable material, frequently asked questions, benefits of recycling, consequences of recycling improperly, and promote awareness of the importance of recycling.



### Advantages:

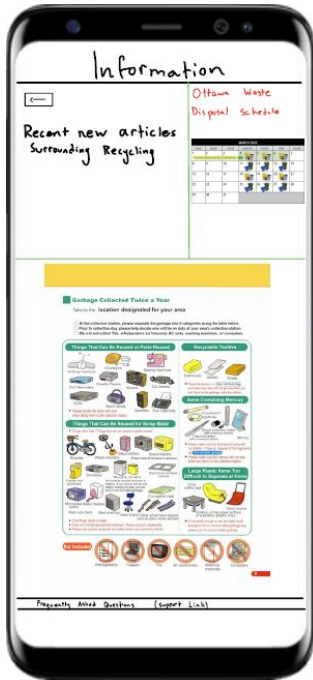
- Displays different types of bins
- Table of different recycling symbols may be useful and promote proper recycling
- Promotes the benefits of recycling

### Disadvantages:

- Buttons at bottom are not as visible
- Font in chart is hard to see
- Table of different recycling symbols may be too complex for younger individuals

## 2.4.2 Ethan Leung

The information menu will provide garbage disposal information relevant to your location. For example, it will display the disposal schedule for your specific area. Along with this schedule, a table will be displayed showing general information about the categories of recycling, such as examples of products and where to dispose of, as well as meaning of waste logos that can be found on the sides of products. A support link will also be provided in case of questions and/or suggestions surrounding the GreenAR World App.



Advantages:

- Has Ottawa recycling schedule

Disadvantages:

- Recent recycling news may be hard to implement in application

### 2.4.3 Monica Harada

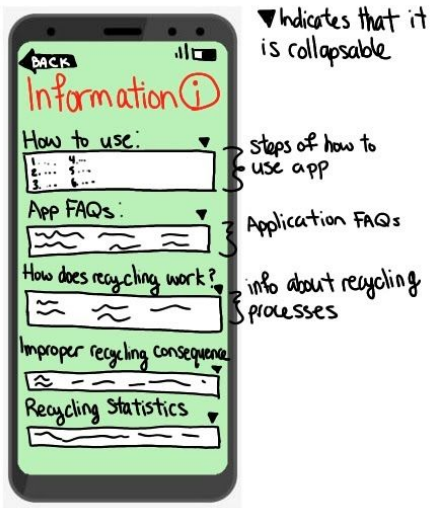
The information menu will act as an information center for GreenAR World users. This menu can include information on how the application works and FAQs about the application. This collapsible menu will also provide various information to the user to give them background knowledge about recycling. The purpose of this menu is to inform users so their recycling habits can improve. The menu will be set up so each information section can be expanded and collapsed so the screen does not look cluttered. Upon opening one menu, another menu will automatically collapse itself to not make it overwhelming for the user. The menu can include photos and videos to make this information section more interactive and engaging.

This menu will include:

- Facts about different types of recycling materials
- Facts about how the different recycling processes work
  - What happens after the user recycles their items
- Facts about the negative impacts that improper recycling has on the environment
- Recycling statistics
- Etc.

Note that collapsible pages in the information menu may be bigger and need scrolling. This is not illustrated in the sketch.





Advantages:

- Step by step procedure on how to use application
- Answers any questions user has
- Recycling definition
- Identifies consequences of improper recycling

Disadvantages:

- May be tougher for younger individuals to use this app

2.4.4 Keera Moretti

When users select the info tab, they will be directed to a multi-page infographic which illustrates various data and information regarding recycling. It also provides users with tips to avoid common recycling errors. Users can press the 'i' icon to access further details on which items can and cannot be recycled in each bin.



Advantages:

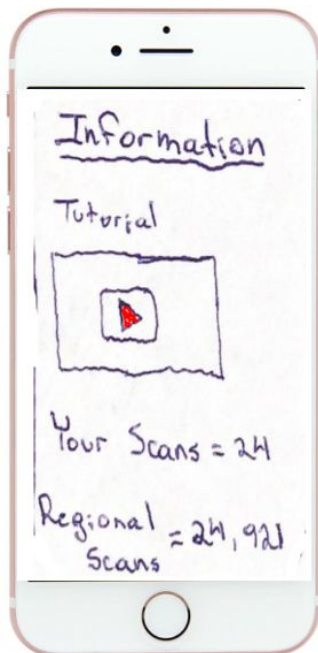
- Aesthetically pleasing
- Recycling statistics is beneficial
- Demonstrates different kinds of recycling and bins
- Identifies common items that are commonly “recycled” but are not supposed to be

Disadvantages:

- Nothing

#### 2.4.5 Alexander Fournier

Menu displaying a short tutorial video on how to work the application itself. Besides the video, it also has information on total items you scanned and recycled. Also has a “world” total or “regional total” where it displays the total amount of items scanned and recycled using the app in your region or worldwide.



Advantages:

- Tutorial video can be beneficial and helps user navigate through the application
- Statistical information

Disadvantages:

- No back button and GreenAR World logo
- Plain screen

## 2.5 Rewards Menu

### 2.5.1 Branden Leung

In the rewards screen, the user will be able to see how much recycling they have done and log the history of their recycling to track progress to reach a higher level in the recycling game. The game will consist of various levels to accomplish. The user will be able to compete against friends and family to achieve the highest score. Users can potentially win prizes.



Advantages:

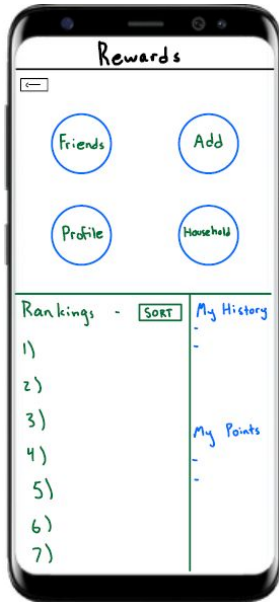
- User's score is enlarged
- Identifies which level user is on
- Shows top 3 competitors of the user

Disadvantages:

- Plain screen
- No button to add new competitors

### 2.5.2 Ethan Leung

The rewards system that will be put in place will be a point gain system for each product recycled. As users accumulate points, they will be placed within a ranking system, globally and locally with friends that they have added on the app. Household teams could be an option as well, with teams of families competing against each other to see who has accumulated the most points.



Advantages:

- Household option available to compete against family members
- Profile button to see progression of recycling
- See multiple rankings and user's history of recycling

Disadvantages:

- No GreenAR World logo

### 2.5.3 Monica Harada

Every user will have an option to sign up for the recycling points system to compete with friends and earn rewards. Every recycle counts for 1 point and for every 100 points, the user can earn a reward (TBD). The rewards menu will feature how many items a user has recycled. There can be a ranking section to show the top 10 in the region/country/world or if you compete against friends, your ranking against your friends. The rewards menu will be a way to give users an incentive to use the application and to recycle properly. The profile menu will be within the Rewards screen.



Advantages:

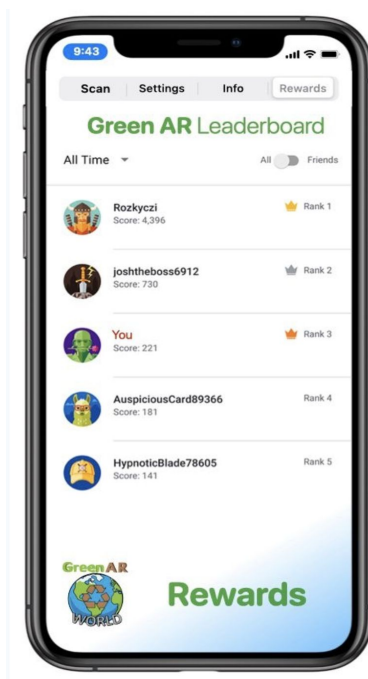
- Drop down menu
- Profile information
- Collected rewards

Disadvantages:

- Age is not required for the profile
- Currently focusing on Ottawa so there is no need for region

#### 2.5.4 Keera Moretti

Users collect points every time they log a successful recycling. The points are displayed under the 'rewards' tab, where a leaderboard shows the top recyclers and their points. Users must sign up and create a profile in order to collect points - however, they are not required to create a profile to simply use the app.



Advantages:

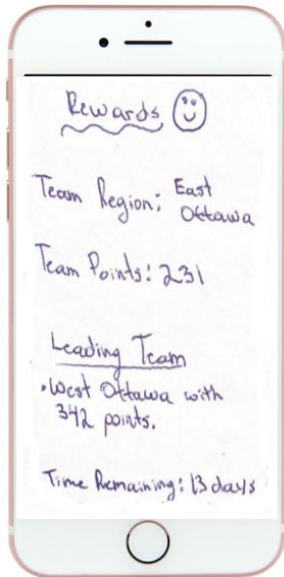
- Simple and clean design
- Identifies 1st, 2nd, and 3rd place easily
- Demonstrates individual scores

Disadvantages:

- Needs a larger print of user's score

### 2.5.5 Alexander Fournier

When signing up you can include your geographic location and this will place you on a “team” of some sorts with everyone in your neighbourhood or region. Then you can earn points for your neighbourhood when recycling and competing against others. Winning neighbourhoods or regions can have small incentives depending on their region.



Advantages:

- Geographic region
- Compete against people in the user’s neighborhood
- Small incentives
- Time limit for recycling competition

Disadvantages:

- Layout of screen is unorganized and cluttered

## 3 Organize and Categorizing Concepts (Subsystems)

This section will be used to categorize, condense, combine, refine and reconsider the subsystem concepts that each group member has come up with from section 2. We have discussed all of the concepts one at a time and have taken/given feedback to one another. Each subsystem was discussed in detail and all advantages and disadvantages were discussed. In the following subsections, we will examine each feature of the subsystems and utilize a selection matrix to determine the best solution for our application. The results of our selection matrices will be used to come up with the fully functional solution for GreenAR World. We have added, removed and combined features of each subsystem. Given time to come up with ideas individually and reconvening afterwards has allowed us to satisfactorily come to a consensus of what features we would like to include.

### 3.1 Selection Matrices

Legend

Worth 1 point
Worth 2 points
Worth 3 points

**Importance Weight:**

On a scale from 1-5, 1 being the least important and 5 being the most important element.

**3.1.1 Introduction Screen Selection Matrix**

Specifications	Importance Weight	Branden	Ethan	Monica	Keera	Alex
User Friendly	3	No start button, automatically goes to main screen after loading	Large, obvious start button	Large, obvious start button	Large, obvious start button	No start button or loading screen, just opens up app
Eye catching design (appealing to users)	1	Simple, only showcases company logo	Earthy colour scheme with company logos around screen	Colourful and engaging with company logo	Simple, only showcases company logo	Screen catches the user's attention. Fun and
Informative	1	None	Recycle Fact	Recycle Fact	None	None
Slogan	1	None	None	None	Yes	Yes
Total Score	N/A	11	16	17	15	11

**3.1.2 Main Screen Selection Matrix**

Specifications	Importance Weight	Branden	Ethan	Monica	Keera	Alex
User Friendly	4	Screen looks cluttered when recycling feature given, unclear how to exit screen	Simple design, large easily recognizable analyze button. Menu buttons are small and unclear	Large, colorful, clear analyze button. The Collapsible menu is unlabeled. Unclear how to get rid of recycling info.	Clean, simple and easy to use. Simple navigation through different menus.	Scan button is a decent size. Menu options are scattered and hard to follow.
Visible Camera View	5	Bordered camera view, did not	Entire screen is camera with overlay	Entire screen is camera with overlay of	When in scan mode, entire screen is in	Camera takes majority of screen

		maximize camera space	of menu options	menu options	camera mode	
Flash Feature	2	None	Yes	Yes	None	None
Scanning button	4	Large “Start Scanning” button	Large “Analyze” button	Large, clear analyze button	Scanning button exists but is not clear to what it does.	Regular sized scanning button
Item Follower	3	Yes	Yes	Yes	None	Yes
Easily Navigate to menu options	5	Info and settings button, small	Small menu buttons, may be hard to find	Has collapsible menu but might be unclear what it is	Minimal menu options, easy to see and understand where each menu will take user	Small scattered menu buttons, might be hard for user navigation
Aesthetically Pleasing	2	Buttons are clear and well defined. However, they are very small	Settings buttons exist without labels. Not colourful	Simple design with some colour, may not be engaging enough	Simple and clean design. All features easily recognizable	Small Scan and search button with limited colors. Buttons are all defined but scattered
Clear Recycle Instructions	5	Recycling information is clear but too wordy	Recycling information is clear and straight to the point	Recycling information simple and to the point but not clear enough	Recycling information is clear and to the point. Informative without being wordy. Timestamps recycled item	Simple and to the point
Saving Recycled Items for Future Use	2	None	None	None	Yes	None
Item Search Option	2	None	None	None	None	Has a search button incase scanning is not done correctly.
Total	N/A	61	75	72	87	62

### 3.1.3 Internal Settings Menu Selection Matrix

Specifications	Importance Weight	Branden	Ethan	Monica	Keera	Alex
User Friendly	4	Large buttons and easy to read	Small buttons and has a tutorial video	Large buttons and easy to read	Easy to use search button and clear buttons	Clear and concise information for users
Notifications	2	Yes	None	Yes	None	None



Location Permissions	3	Yes	Yes	Yes	Yes	Yes
Camera Access	5	Yes	Yes	Yes	Yes	None
Volume On/Off	4	Yes	None	None	None	None
Battery Saver	4	Yes	None	None	None	None
Vibrations	1	Yes	Yes	None	None	None
Language	4	Only English	No language option	Language option available with drop down menu	Only English	Language option available
Customer Support	5	None	None	Yes	None	None
Region determination (recycling policies)	3	None	None	None	Includes municipality recycle policies by search	None
Profile Information	3	None	None	None	None	Includes username and password
Total Score	N/A	95	77	95	91	86

### 3.1.4 Information Menu Selection Matrix

Specifications	Importance Weight	Branden	Ethan	Monica	Keera	Alex
User Friendly	3	All information is on one page and buttons on bottom to navigate to various pages.	All information on one page. Can navigate to different areas of the information page. Scattered and somewhat unclear.	All menus are collapsible. Too much information on one page.	Information separated by pages and to view different pages, must swipe. Easy to use and informative.	Includes limited information.
Recycle Bin Descriptions	3	Clearly shows pictures and identifies different waste disposal bins	Does not give information on recycle bins.	Does not give information on recycle bins.	Clearly shows pictures and identifies different waste disposal bins.	Does not give information on recycle bins.
FAQ	1	Yes	Yes	Yes	None	None
Recycling	3	Redirect to	Includes a	Includes a	Shows facts	Does not

Importance/ benefits/News info		another page to read up on the benefits of recycling. Doubtful that the user will read through so much information.	section for the latest recycling articles which is informative.	section for the benefits of recycling and how recycling works. Informative but not sure if users will find it helpful.	about the harms of improper recycling in a clear and engaging way. Not wordy.	include recycling facts.
Garbage Disposal Schedule	4	None	Yes	None	None	None
Disposable and Non Disposable	5	None	Yes	None	Yes	None
How to use Application	3	None	None	Includes step by step instructions of how to use the application.	None	Includes a tutorial video.
Waste Breakdown/ Statistics	2	None	None	Section for recycling statistics.	Includes clear statistics of how much waste is produced and recycled properly individual/hou sehold.	None
Plastic Specifications	2	Yes	Yes	None	None	None
Total	N/A	56	62	53	68	47

### 3.1.5 Rewards Selection Matrix

Specifications	Importance Weight	Branden	Ethan	Monica	Keera	Alex
User Friendly & aesthetics	4	Easy to navigate but not as physically appealing	Easy to navigate and layout of rewards is simple/clear	Easy to navigate and colorful. Many small symbols for easy visualization	Clean and innovative design. Can easily interpret different scores. Gradient background	Easy to interpret and displays time remaining for each team to gain points
User's Score Visibility	5	User's score is enlarged and easily visible	User's score is present but not large enough	User's score is clear and easily interpreted	User's score is only visible if user is ranked top 5 competitors	Team Score is available all the time and is large
Different Levels	1	Yes	None	None	None	None

Competitors Ranking	4	Competitor rankings are available (up to 3)	Competitor rankings are available (up to 7)	List of competitors available using drop down menu	Competitor rankings are available (up to 5)	None, only says leading team
Add Friends & Family	5	No button for adding new competitors	Button present for adding friends and family	No button for adding new competitors	No button for adding new competitors	No button for adding new competitors
Recycling History Log	2	None	Ability to log recycling history and points associated	None	None	None
Profile Information	3	None	Profile button available	Profile information displayed	None	None
Household & Neighborhood Competitors	3	None	Household option available	None	None	Yes, neighborhood and team option available
Region Identification	3	None	None	None	None	Yes
Total Score	N/A	48	72	66	54	62

### 3.2 Final 5 Fully Functional Solutions (Each Subsystem)

#### Introduction Screen:

The introduction screen will include a large “Start” button that will be used to advance to the main screen, the GreenAR World logo, and the slogan “Recycling made simple”. As for the background of the introduction screen, a green gradient background will be used.

#### Main Screen:

The main screen will be primarily the view of the camera, with an “Analyze” button that will be used to identify the scanned object and display disposal information. To the right of the “Analyze” button, a flash toggle will be found to ensure usability in both day and night conditions. To the left of the “Analyze” button, a search icon will be present, for the rare occurrence where the identification malfunctions. The user will then be able to manually input the type of waste they wish to dispose of and receive proper instructions. In the top left corner of the screen, a collapsible menu toggle will be available. When interacted with, the menu will expand across the very top portion of the screen, showing menus for settings, rewards and further information.

#### Internal Settings Menu:

Within the internal settings menu, the following options will be available to toggle. App permissions will be available to allow or disallow the usage of the device’s camera and location services.

A notification toggle for whether the device will be allowed to notify of any new activity or news. A language selector will be available in case of international use. A track rewards toggle for if the user would prefer to not document their activities with this app. A vibration/sound toggle if the user prefers if the device provided no feedback when identifying waste. Lastly, a Geo-Map toggle for if the user would like to have access to a map of their location that may have locations of waste disposal.

### **Information Menu:**

The information menu will contain statistics and entertaining facts surrounding recycling. Its main purpose is to act as an informatory page, where users can learn the truth about recycling, and how their efforts can help improve this. Alongside this, the information menu will include the waste disposal schedule associated with your location/city. A short tutorial video will also be provided in this section for new users who are confused or are trying to maximize the use of this app. A frequently asked questions (FAQ's) section will also be provided to answer common questions that users may have.

### **Rewards Menu:**

The rewards menu will include sections called; profile, friends, household, and rankings. The profile section will house all your statistics regarding the use of this app, including recycling history, total points accumulated. The friends section will allow you to view the profiles of friends that you have added in the app. The household section will allow the user to create a household and add friends or family to compete against other households. The ranking section will have a sort function that will display different standings depending on what is selected. The ranking section can be set to global, where you are put in a worldwide ranking of the best users. It can be set to friends only, where you compete against your added friends for the top spot. The rankings can lastly be set to households, where households can compete against each other for first place.

## 4 Final Design

This section showcases illustrations of our final design based on descriptions given in section 3.2. All inputs were taken into consideration based on the selection matrix and group discussions to come up with a mutually agreed upon output.

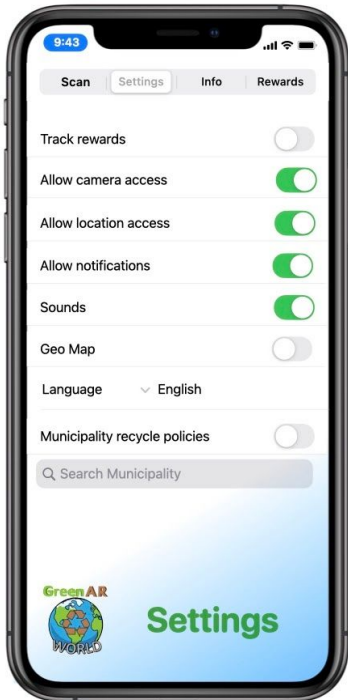
### **Introduction Screen:**



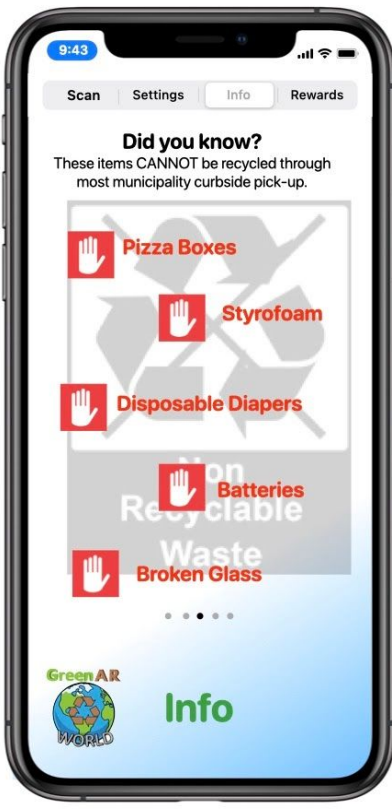
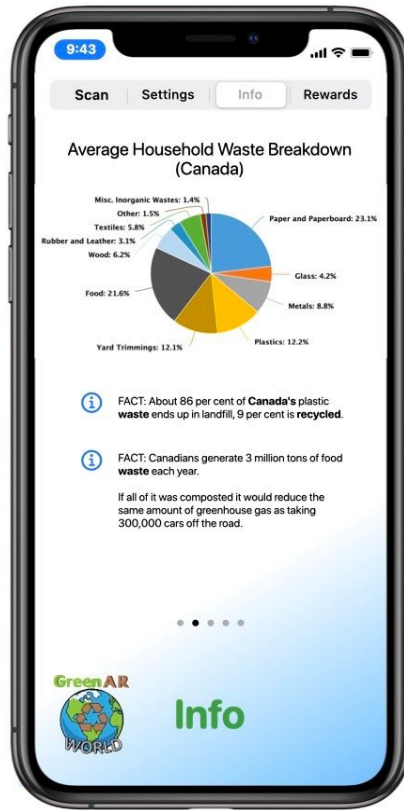
**Main Screen:**



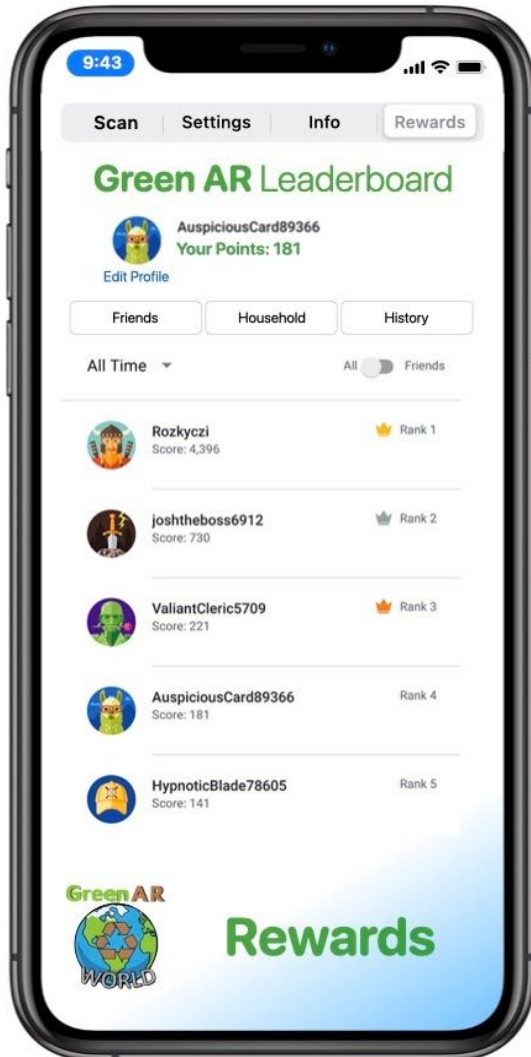
**Internal Settings Menu:**



**Information Menu:**



## Rewards Menu:



## 5 Conclusion

In conclusion our team has individually created concepts for each subsystem and included ideas we think should be included into the final design, as well as features we believe could be beneficial to include. After each team member created their concepts for each subsystem, we all came together and analyzed each of our systems using a selection matrix to identify which concepts are more important than others. From this we were able to condense all of our concepts, and decide which features are the most beneficial, and should be included in the final design. Moving forward our team will look at time management to ensure our design is achievable within the time frame given. On top of this our team will also look at costs, and budget our money to make sure all aspects we have chosen to go with are within our means.

