



Refill.Me

No Waste, No Haste - Package-Free

Final Prototype Demo

By Team Iron
Old Dominion University
CS 411W
5/3/2023
Spring 2023

Image source:

<https://www.pexels.com/photo/person-holding-orange-fruits-in-white-net-3737624/>





At a Glance

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Image source:
<https://pixnio.com/food-and-drink/ingredients-market-boxes-colours-foodfruit-vegetable-grocery#>

Meet the Team



Judit Chang-Horvath
Project Manager /
Database Developer



Abdullah Pathan
Front end developer /
Webmaster



Katelynn Hull
Database developer /
Document specialist



Gavin Rios
Front end developer



Michael Colombini
Back end developer



Kira Maximova
Back end developer



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Back end developer



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Mentor

Packaging Waste: A Big Problem

USA

- ❖ 82.2 million tons of packaging waste / year
(in 2018) ⁽³⁾
- approx. 160 times the weight
of the One World Trade Center
- ❖ 28.1 % of total waste generation ⁽³⁾



Image source:

https://commons.wikimedia.org/wiki/File:One_World_Trade_Center_Building.jpg

Main Issues With Packaging

Plastic - Paper - Aluminum - Glass

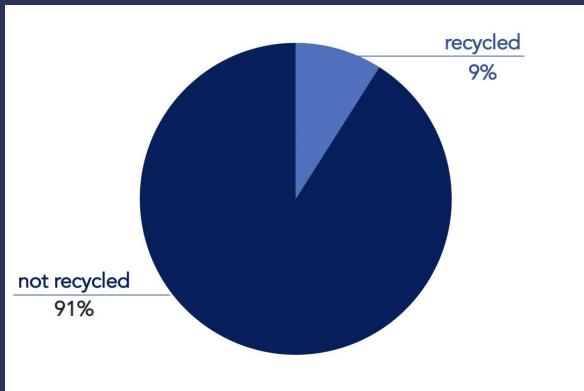
- ❖ greenhouse gas emissions ⁽⁸⁾
- ❖ microplastics pollution ⁽⁸⁾
- ❖ usage of nonrenewable resources ⁽⁸⁾
- ❖ plastic and glass do not biodegrade ⁽¹⁾
- ❖ paper can be recycled max. seven times ⁽⁹⁾
- ❖ leakage of harmful chemicals from plastic packaging into food ⁽⁵⁾
 - ❖ paper packaging: often lined with plastic ⁽¹⁰⁾



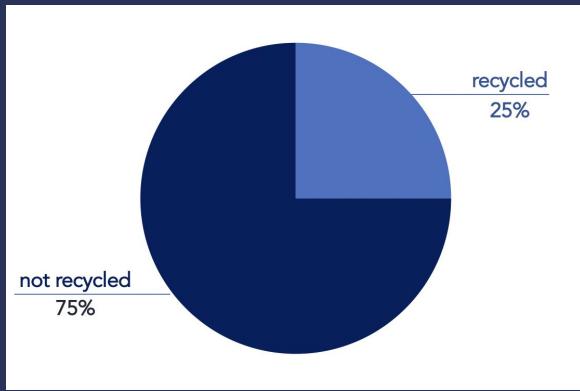
Image source: <https://www.flickr.com/photos/jeepersmedia/15213386005>

Recycling Is Not Good Enough

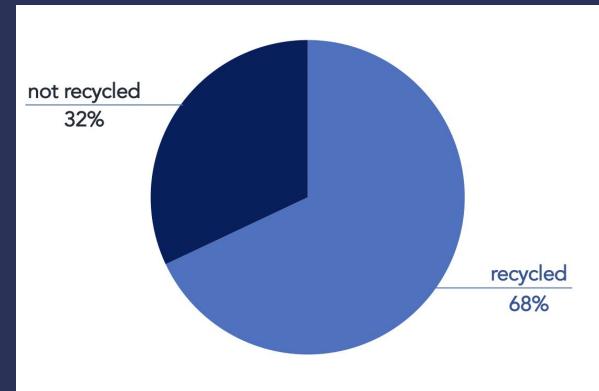
Recycling rates (in 2018) ⁽⁴⁾



Plastic



Glass



Paper

What We Mean By Package-Free Shopping

BYOC Bring Your Own Containers

- ❖ tote bags
- ❖ plastic or glass jars, boxes
- ❖ plastic or glass bottles for liquids
- ❖ produce bags



Who Is Struggling?

Shoppers who would like to

- ❖ reduce their packaging waste
- ❖ reduce transportation emissions
- ❖ consume with consciousness

In the USA, concerned about packaging waste: ⁽²⁾

87% of Generation Boomers

79% of Generation X

83% of Generation Millennials

85% of Generation Z



Image source:
<https://www.pexels.com/photo/crop-woman-putting-vegetables-into-wicker-basket-7262859/>

Problem Statement

Mainstream grocery shopping damages our ecosystem through packaging waste from cans, glass, cardboard, and plastic.

Shoppers who are interested in reducing their environmental impact and would like to do package-free shopping lack detailed information such as product and price listings of loose products that are available in their neighborhood.

These shoppers need a tool that provides relevant and accessible information to make sustainable shopping less intimidating.



Problem Characteristics

Lack of Information

zero or little knowledge about where package-free stores are located

lack of knowledge about stores' package-free offerings

lack of transparency regarding prices of loose products

Shoppers' Struggle

frustrated by unnecessary, wasteful packaging

tiresome and difficult to search for package-free stores and products

lack of knowledge about containers to use

Missing Hub

existing apps offer limited features that are only somewhat useful for package-free shoppers, as opposed to many apps supporting mainstream grocery shopping

Our Solution: Refill.Me

Refill.Me is an encompassing information-hub in the form of a mobile phone application that provides relevant, practical and up-to-date information regarding package-free shopping.

Refill.Me helps novice package-free shoppers throughout their transition into package-free shopping and supports experienced shoppers to keep up their eco-friendly shopping habits.

By using Refill.Me, package-free shoppers save time and support local businesses, while reducing packaging waste.



Image source
<https://www.flickr.com/photos/nenadstojkovic/49984904868>

Solution Characteristics

Plenty of Information

exhaustive listing of nearby supermarkets with bulk section, package-free stores, and farmers' markets

product listings with unit prices

Shoppers' Delight

easy search by product or by stores
information about containers provided in the Container Guide, and by the smart container recommendation feature

shopping list makes shopping easy to plan

reward system, Reward.Me to collect points and enjoy discounts

Resource Hub

a convenient app for both new and experienced package-free shoppers

collect shoppers' search information to improve stores' product offerings

use crowdsourcing to increase data accuracy

Benefits

Users

- easy to plan package free shopping based on store and product information
- good understanding of needed containers
- transparency regarding prices

Shops

- attract package-free shoppers
- increase revenue
- increase digital presence
- gain first-hand information about products that shoppers are searching for
- being rated by shoppers

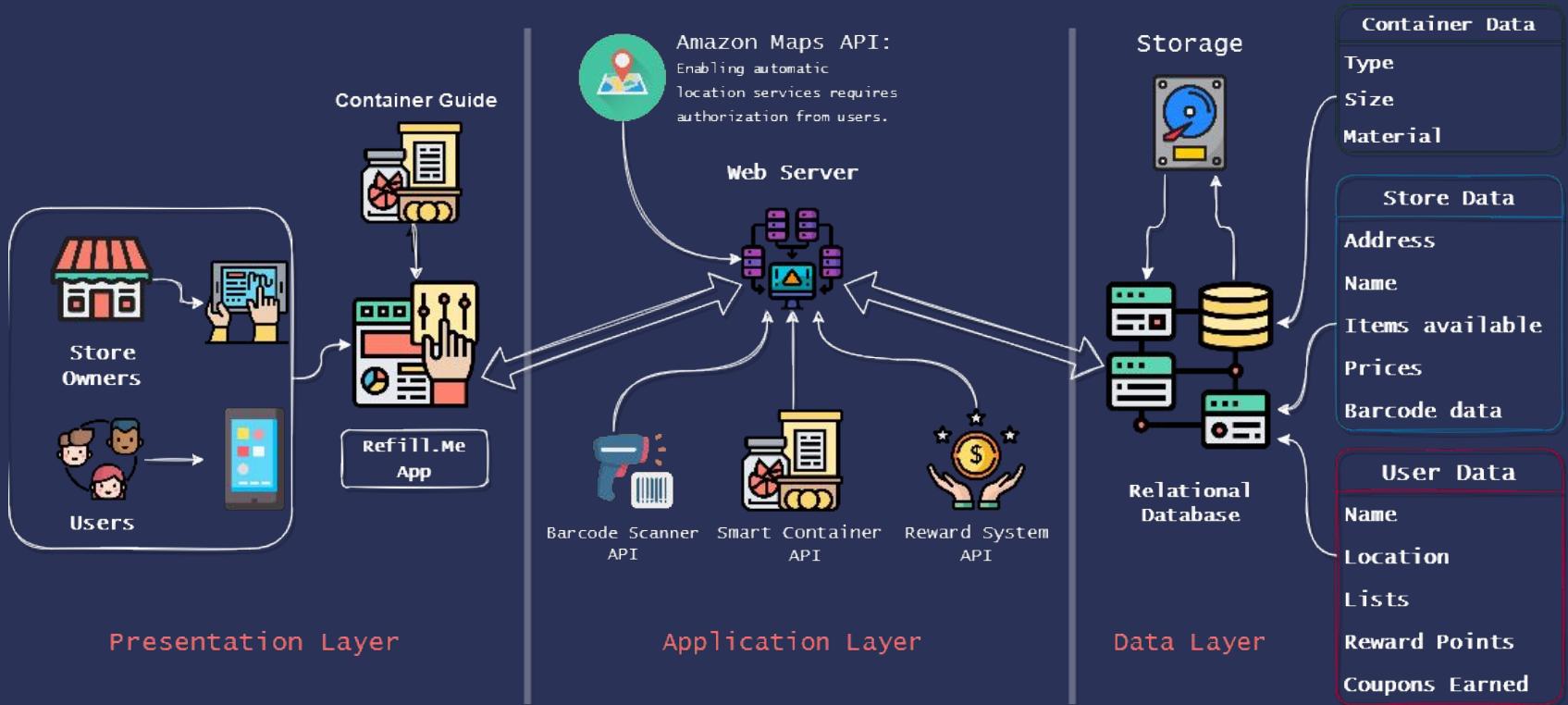
Environment

- less trash
- less food waste
- less harmful chemicals

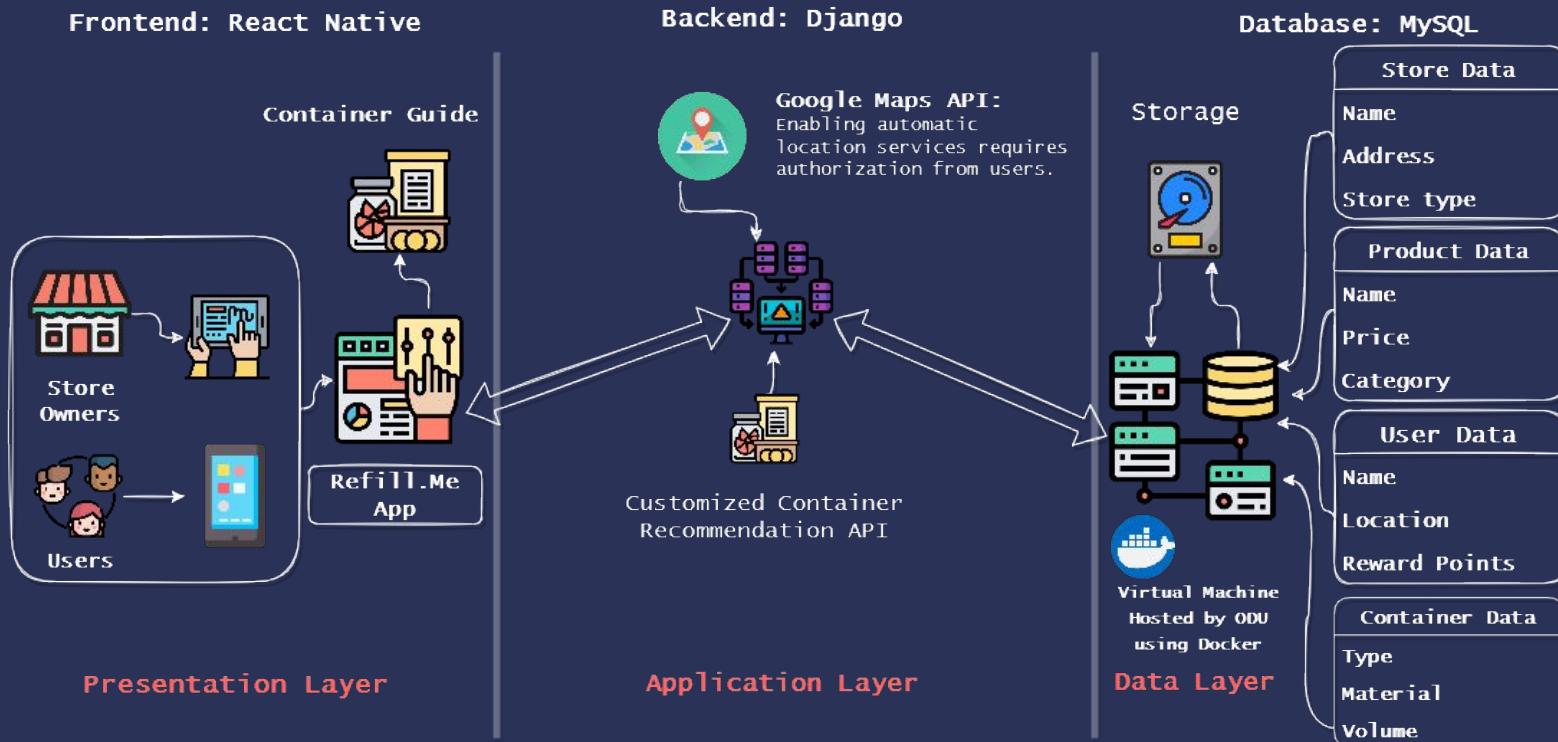
Our Partners

Stakeholders	Customers	Users
<ul style="list-style-type: none">- non-governmental environmental organizations- individual investors	<ul style="list-style-type: none">- supermarkets with bulk section- package-free stores- farmers' markets	<ul style="list-style-type: none">- novice package-free shoppers- experienced package-free shoppers
<i>contributions</i>	<i>app usage</i>	<i>app usage</i>
<ul style="list-style-type: none">❖ initial funding❖ ideas❖ networking	<ul style="list-style-type: none">❖ free account❖ manage list of products❖ update prices	<ul style="list-style-type: none">❖ free trial period❖ subscription-based pricing model

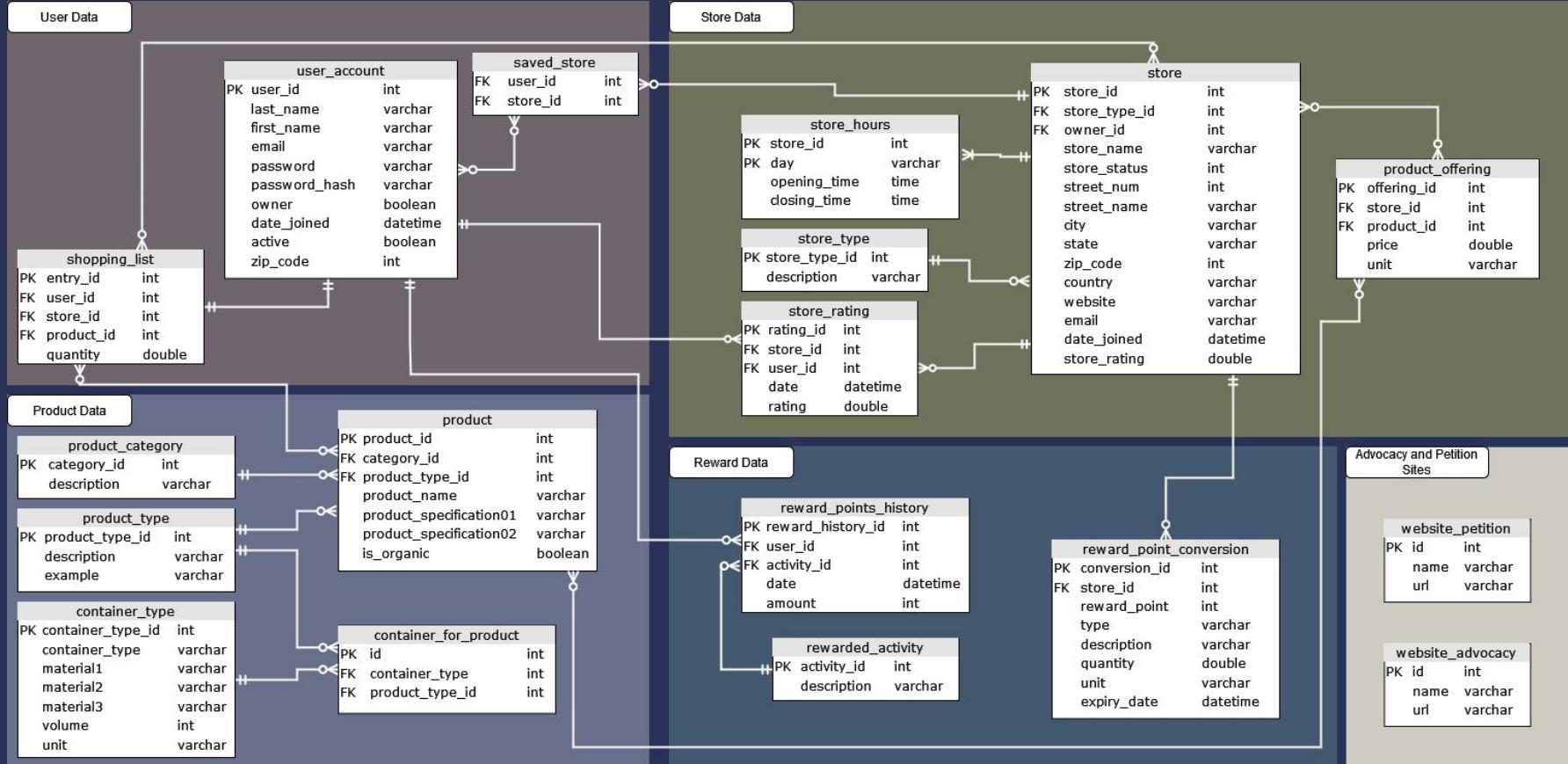
RWP Major Functional Component Diagram



Prototype Major Functional Component Diagram



Database Schema



Sprint Breakdown

*Each sprint represent 2 weeks

01/07 - 02/01

Sprint 0: Setup & Configure

- Setup the development environment
- Configure Trello board
- Setup GitHub
- Automated Database Backup

02/17 - 03/03

Sprint 2: User Interfaces

- UI basic functionality
- Integrate frontend and backend
 - User profiles/logins
 - Define user roles

02/01 - 02/17

Sprint 1: Framework

- Build Container Guide (mock data)
- Build Advocacy and Petition site
- Automated Frontend and Backend Backup

03/03 - 03/17

Sprint 3: Major Features I.

- Product search Functionality
 - Enter product's name

Sprint Breakdown

*Each sprint represent 2 weeks

03/17 - 03/31

Sprint 4: Feature Expansion I.

- Shopping List
- Customized Container Recommendation
- Store search

04/14 - 04/28

Sprint 6: Feature Expansion II.

- Customized Container Recommendation
- Crowdsourcing: Lemme.Know
- Reward.Me
- Profile screen
- Improve/polish UI

03/31 - 04/14

Sprint 5: Feature Enhancements

- Shopping List
- Customized Container Recommendation
- Store search

Optional

Sprint 7: Polish and Release

- Automated recovery
- Automated Unit / System tests
- Automated CI/CD pipelines

GitHub Project

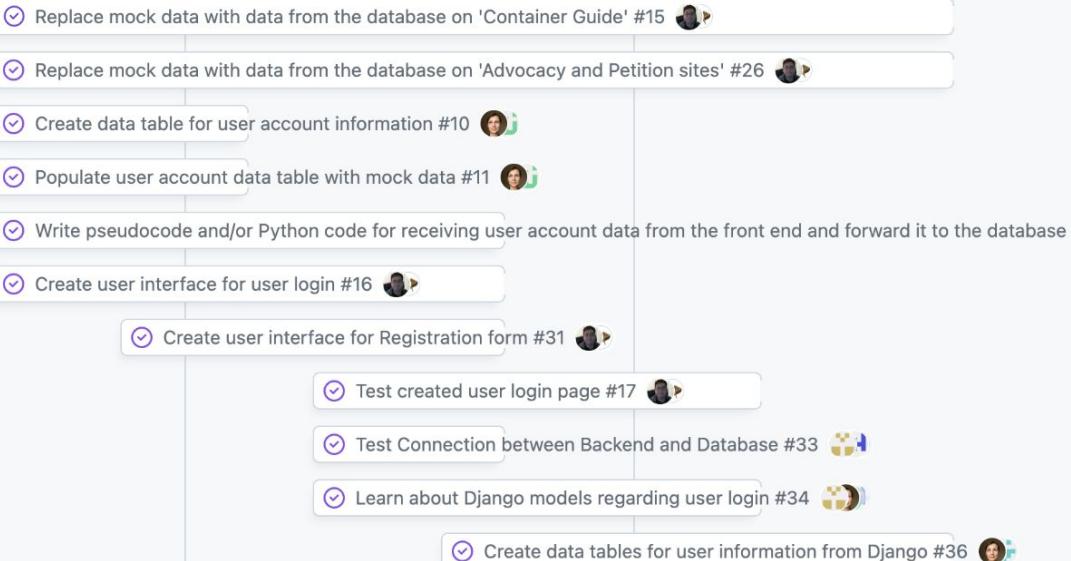
Sprint_1_Framework 8		Tue, Feb 7 - Fri, Feb 24	
1	<input checked="" type="checkbox"/> Create data tables for the data related to the 'Container Guide' #8	<input checked="" type="checkbox"/> Create data tables for the data related to the 'Container Guide' #8	
2	<input checked="" type="checkbox"/> Create data table for advocacy and petition sites #7	<input checked="" type="checkbox"/> Create data table for advocacy and petition sites #7	
3	<input checked="" type="checkbox"/> Connect the backend to the database #4	<input checked="" type="checkbox"/> Connect the backend to the database #4	
4	<input checked="" type="checkbox"/> Set up user roles for the database #9	<input checked="" type="checkbox"/> Set up user roles for the database #9	
5	<input checked="" type="checkbox"/> Write pseudocode and/or Python code for getting the data fro... #6	<input checked="" type="checkbox"/> Write pseudocode and/or Python code for getting the data from the database for the 'Container	
6	<input checked="" type="checkbox"/> Write pseudocode and/or Python code for getting the data fro... #5	<input checked="" type="checkbox"/> Write pseudocode and/or Python code for getting the data from the database for the 'Advocacy	
7	<input checked="" type="checkbox"/> Create user interface for the 'Container Guide' using mock data #14	<input checked="" type="checkbox"/> Create user interface for the 'Container Guide' using mock data #14	
8	<input checked="" type="checkbox"/> Create user interface for the 'Advocacy and Petition sites' usi... #24	<input checked="" type="checkbox"/> Create user interface for the 'Advocacy and Petition sites' using mock data #24	

GitHub Project

Sprint_2_User_Interfaces 12

- 9 Replace mock data with data from the database on 'Container...' #15
- 10 Replace mock data with data from the database on 'Advocac...' #26
- 11 Create data table for user account information #10
- 12 Populate user account data table with mock data #11
- 13 Write pseudocode and/or Python code for receiving user acc... #12
- 14 Create user interface for user login #16
- 15 Create user interface for Registration form #31
- 16 Test created user login page #17
- 17 Test Connection between Backend and Database #33
- 18 Learn about Django models regarding user login #34
- 19 Create data tables for user information from Django #36

Fri, Feb 17 - Fri, Mar 3



GitHub Project

The screenshot shows a GitHub project board with a sidebar and a main board area.

Sprint_3_Major_Features (8 tasks)

- 24 Implement Product Search user interface ... #37
- 25 Write pseudocode and/or Python code for... #38
- 26 Implement the design of the two 'Product ... #44
- 27 Implement the user interface for the prod... #45
- 28 Implement the user interface where the m... #46
- 29 Implement the Product Search functionali... #39
- 30 Implement the button for the 'Advocacy a... #52
- 31 Test created product search page #40

Fri, Mar 3 - Fri, Mar 17

- Implement Product Search user interface design #37 (checkmark, person icon)
- Write pseudocode and/or Python code for the Product Search functionality #38 (checkmark, plus icon)
- Implement the design of the two 'Product Search' actions: 'Search by Icon' and 'Enter Product Name' #44 (checkmark, person icon)
- Implement the user interface for the product listing #45 (checkmark, person icon)
- Implement the user interface where the message "No product found" is displayed #46 (checkmark, person icon)
- Implement the Product Search functionality on the backend #39 (checkmark, gear icon)
- Implement the button for the 'Advocacy and Petition sites' #52 (checkmark, person icon)
- Test created product search page #40 (checkmark, person icon)

GitHub Project

◀ Sprint_4_Feature_Expansion 9

Fri, Mar 17 - Fri, Apr 28

24 Define User Roles in Django for Shoppers and Store Owners #67

25 Set up authentication between Django and the database #64

26 Create mock data for the data tables #65

27 Implement Zip Code search functionality for Store Search fea... #50

28 Authenticate tokens between frontend and backend #66

29 Normalize Product data table #68

30 Update Shopping List data table based on #68 #69 #69

31 Update Django models based on #68 and #69 #70

24 Define User Roles in Django for Shoppers and Store Owners #67

25 Set up authentication between Django and the database #64

26 Create mock data for the data tables #65

27 Implement Zip Code search functionality for Store Search fea...

28 Authenticate tokens between frontend and backend #66

29 Normalize Product data table #68

30 Update Shopping List data table based on #68 #69

31 Update Django models based on #68 and #69 #70

GitHub Project

Sprint 5 & 6 Feature Expansion II 28

Fri, Apr 14 - Fri, Apr 28

Issue	Description	Assignee	Labels
33	Implement user login process #13		
34	Implement Product Search user interface design #37		
35	Test created product search page #40		
36	Implement the design of the two 'Product Search' actions: 'Search by Icon' and 'Enter Product Name' #44		
37	Implement the user interface for the product listing #45		
38	Implement the user interface where the message "No produc..." #46		
39	Implement Store Search pages & Check responsiveness #22		
40	Integrate Google Maps API with Store Search functionality #47		
41	Implement Nearby Store functionality with Store Search feature #48		
42	Design store listing form for Store Search feature #49		
43	Implement the user interface where the message "No store fo..." #51		
44	Ensure that Shopping List page is dynamically responsive #53		
45	Ensure that products from the product listing can be added to the Shopping List #54		
46	Ensure that products are grouped by store in the Shopping List #55		
47	Implement buttons for increasing/decreasing the quantity of products in the Shopping List #56		
48	Implement a button for item removal from the Shopping List #57		
49	Create a 'Container Recommendation' button in the Shopping List #58		
50	Implement Shopping List user interface #61		
51	Implement Lemme.Know (earlier called Suggested Edits) feature #75		

GitHub Project

April 2023

8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	1	2	3	4	5	6
52	53	54	55	56	57	58	59	60				52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68

8 Implement the Customized Container Recommendation user interface #59
9 Implement the algorithm for Customized Container Recomme... #60
10 Design Shopper Menu component #27
11 Design Store Owner Menu component #28
12 Implement main menu for Shopper #73
13 Implement main menu for Store Owner #74
14 Implement the interface for displaying the listing of each prod... #62
15 Implement the interface for displaying total number of contai... #63
16 Add User Manual #93

20 Implement the Customized Container Recommendation user interface #59
21 Implement the algorithm for Customized Container Recomme... #60
22 Design Shopper Menu component #27
23 Design Store Owner Menu component #28
24 Implement main menu for Shopper #73
25 Implement main menu for Store Owner #74
26 Implement the interface for displaying the listing of each product with the corresponding container #62
27 Implement the interface for displaying total number of containers needed for a specific shopping #63
28 Add User Manual #93

29

30

1

2

3

4

5

6

Markers Start Date Date fields Month Today < >

This image shows a GitHub project timeline for April 2023. The left side lists tasks assigned to users, and the right side shows their status on specific dates. The tasks are: 52 (Completed), 53 (In Progress), 54 (In Progress), 55 (In Progress), 56 (Completed), 57 (In Progress), 58 (Completed), 59 (In Progress), 60 (Completed). On April 20, tasks 52 and 53 are in progress. On April 21, task 54 is in progress. On April 22, task 55 is in progress. On April 23, task 56 is completed. On April 24, task 57 is in progress. On April 25, task 58 is completed. On April 26, task 59 is in progress. On April 27, task 60 is in progress. On April 28, task 61 is in progress. On April 29, task 62 is in progress. On April 30, task 63 is in progress. On May 1, task 64 is in progress. On May 2, task 65 is in progress. On May 3, task 66 is in progress. On May 4, task 67 is in progress. On May 5, task 68 is in progress.

Original Prototype vs. Current Prototype Features: Shoppers

Feature	Real World Product	Original Prototype	Current Prototype
Account Creation	Fully Implemented	Fully Implemented	Partially Implemented
Store Search	Fully Implemented	Fully Implemented	Partially Implemented
Product Search			
Search by Icon	Fully Implemented	Partially Implemented	Partially Implemented
Scan product's barcode	Fully Implemented	Closed	Closed
Enter product's name	Fully Implemented	Fully Implemented	Partially Implemented
Container Guide	Fully Implemented	Fully Implemented	Fully Implemented
Container Recommendation	Fully Implemented	Fully Implemented	Partially Implemented
Shopping List	Fully Implemented	Fully Implemented	Partially Implemented
Reward.Me			
Collect reward points	Fully Implemented	Fully Implemented	Partially Implemented
Receive coupons	Fully Implemented	Closed	Closed
Crowdsourcing			
Lemme.Know	Fully Implemented	Fully Implemented	Partially Implemented
Store Rating	Fully Implemented	Partially Implemented	Partially Implemented
Connect shoppers to advocacy & petition sites	Fully Implemented	Fully Implemented	Fully Implemented

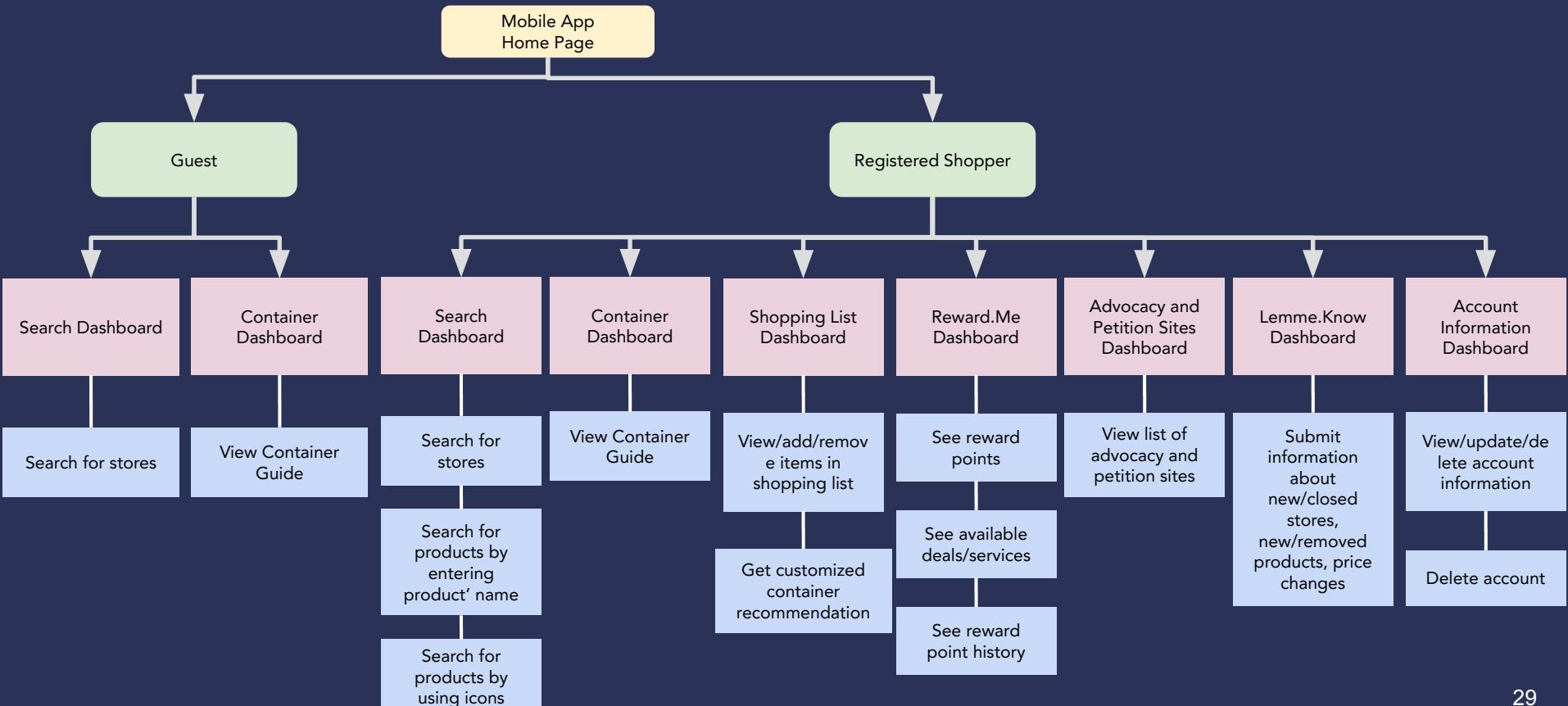
Original Prototype vs. Current Prototype Features: Store Owners

Feature	Real World Product	Original Prototype	Current Prototype
Product and Price Dashboard	Fully Implemented	Fully Implemented	Closed
Reward Point Conversion Dashboard	Fully Implemented	Fully Implemented	Closed
Coupon Dashboard	Fully Implemented	Closed	Closed
Store Rating Dashboard	Fully Implemented	Partially Implemented	Closed
Search Information Dashboard	Fully Implemented	Partially Implemented	Closed

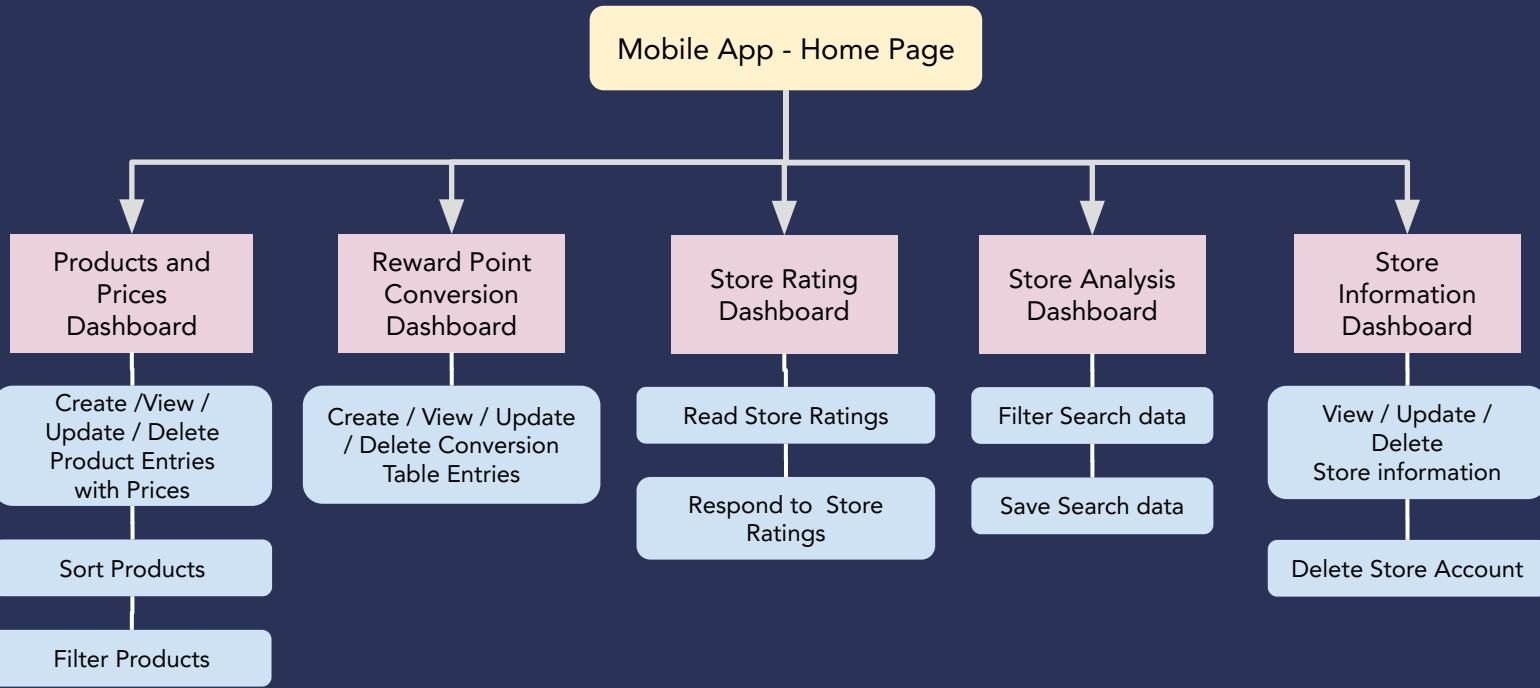
Planned vs. Actual Development Tools

	Planned Development		Actual Development	
	Web App (Front End)	Server (Backend)	Web App (Front end)	Server (Backend)
Language	HTML/CSS/JavaScript	JavaScript	HTML/CSS/JavaScript	Python
Architecture	React Native	Node.js	React Native	Django
IDE	Visual Studio	Visual Studio	Visual Studio	Visual Studio
UI/UX	Mockup design tool		Mockup: draw.io	
Database	Amazon RDS for MySQL		MySQL hosted on ODU's VM	
Build Manager/ Issue Tracking/ Testing	Gitlab CI/CD (Continuous Integration/Delivery/Deployment)		GitHub Issues and GitHub Project	

Site Map - Shopper



Site Map - Store Owner



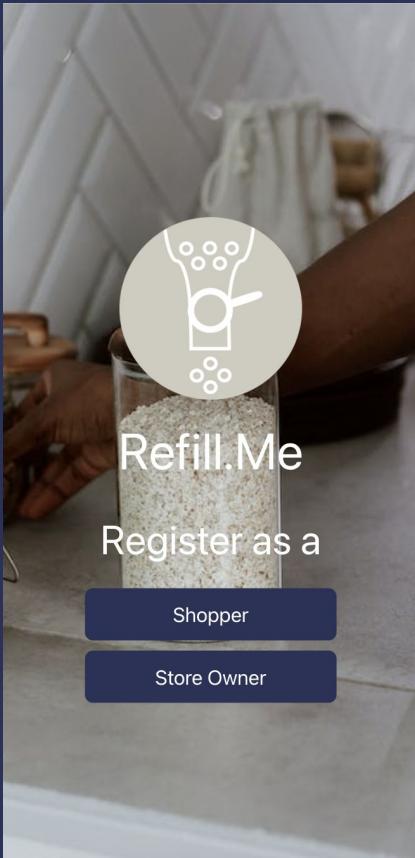
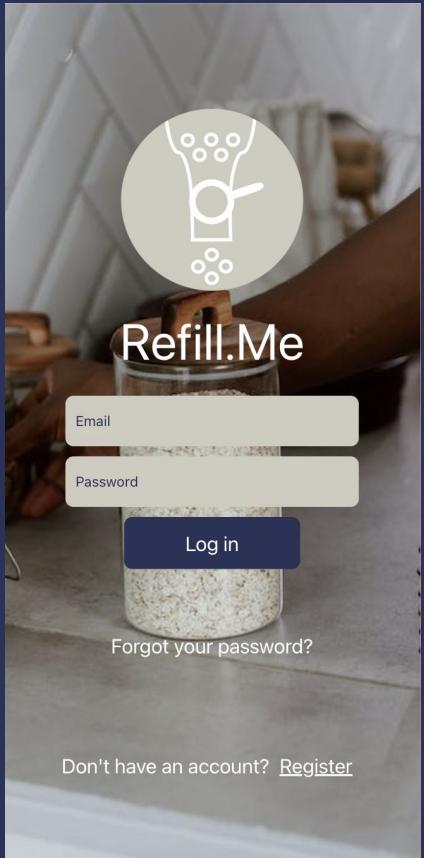
Challenges Encountered

- ❖ Challenges with APIs
 - Setting up API endpoints
 - Making API calls by passing certain IDs
 - Preparing data for the API endpoints using Django
- ❖ Integrating Google Maps
- ❖ Steep learning curve
 - Docker
 - Django
 - React Native
- ❖ Time constraint

What We Accomplished

- ❖ Set up a MySQL database on the ODU VM using Docker
- ❖ Set up communication between backend and the database
- ❖ Set up with API endpoint to ensure communication between backend and frontend
- ❖ Created multiple screens in our React Native app
- ❖ Built out functionalities for our app

UI Screenshots: Login & Registration



Registration Shopper

First Name
Last Name
Username
Email
Password
Confirm Password
Submit

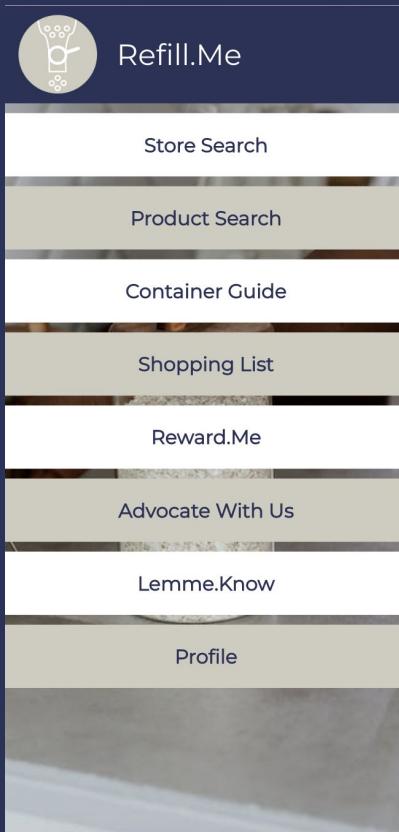
Registration Store Owner

First Name
Last Name
Username
Email
Password
Confirm Password
Store Name
Store Address

Store Hours (Optional)

Monday	<input type="text"/>	<input type="text"/>
Tuesday	<input type="text"/>	<input type="text"/>
Wednesday	<input type="text"/>	<input type="text"/>
Thursday	<input type="text"/>	<input type="text"/>
Friday	<input type="text"/>	<input type="text"/>
Saturday	<input type="text"/>	<input type="text"/>
Sunday	<input type="text"/>	<input type="text"/>

UI Screenshots: Home, Advocacy & Petitions, and Container Guide



Advocacy and Petition Sites

Are you ready to take action?
Here are some useful links:

- WWF
- Beyond Plastics
- Going Zero Waste
- Polly Barks
- Canopy
- Change
- Greenpeace
- Plastic Pollution Coalition
- Aim Plastic Free

Container Guide

Get familiar with some of the containers you can use to shop package free!

- Tote bag**
textile
for packing & for fruits and vegetables
- Produce bag**
textile
for fruits and vegetables
- Bag**
textile, paper
for nuts, beans, pasta, spices, tea, coffee, etc.
- Jar**
glass, plastic
for nuts, beans, pasta, spices, tea, coffee, etc.
- Bottle**
glass, plastic
for oil, vinegar, detergents, lotion, etc.
- Box**
glass, plastic, paper
for nuts, beans, pasta, spices, tea, coffee, etc.

UI Screenshots: Store Search

Store Search Results

- Mom's Organic Merrifield
Fairfax VA
- Trace
Vienna VA
- Mason \$ Greens
Alexandria VA
- Mom's Organic Alexandria
Alexandria VA
- FullFillery
Washington DC

New Search

Trace

140 Church St. NW, Vienna, VA 22180

4.0 ★ ★ ★ ★ ☆

View Products

Opening Hours

Friday: 10:00:00-18:00:00
Monday: 10:00:00-18:00:00
Saturday: 10:00:00-18:00:00
Sunday: 12:00:00-17:00:00
Thursday: 10:00:00-18:00:00
Tuesday: 10:00:00-18:00:00
Wednesday: 10:00:00-18:00:00

Trace's website

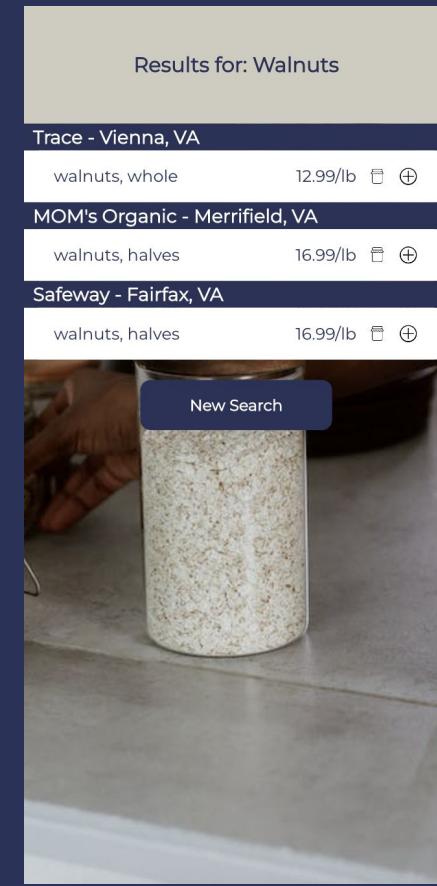
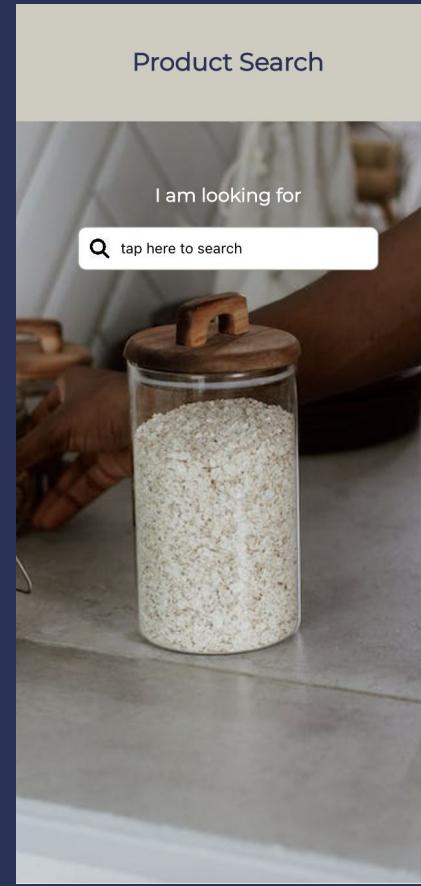
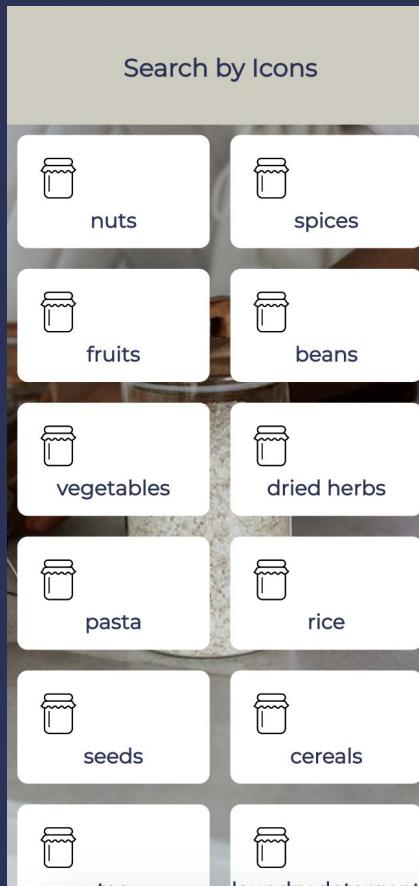
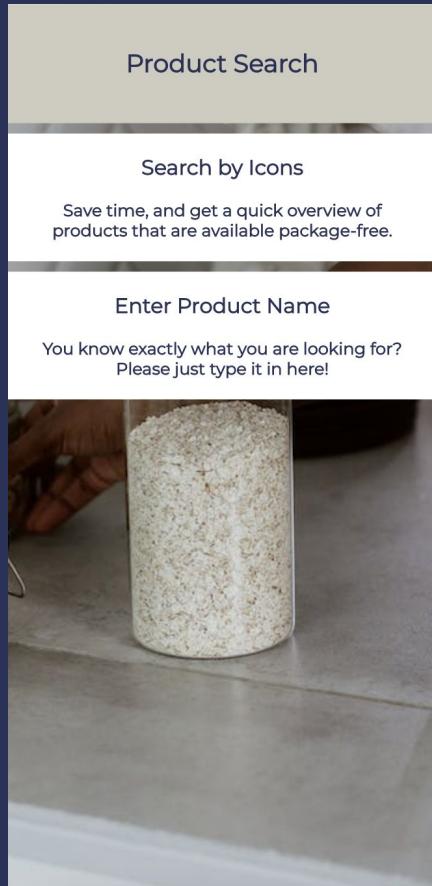
tracezerowaste@gmail.com

Rate Store

★ ★ ★ ★ ☆

Submit

UI Screenshots: Product Search



UI Screenshots: Shopping List and Container Recommendations

My Shopping List

GoodFills

penne (not organic)	\$ 2.56 / lb
	2.5 lb

Container Recommendation

Zuke's Refillery

fussili (organic)	\$ 2.89 / lb
	1.2 lb

Container Recommendation

Eco Loka

rigatoni (not organic)	\$ 1.41 / lb
	5 lb
farfalle (not organic)	\$ 1.07 / lb
	3.5 lb

Customized Container Recommendation

For all products in your shopping list, you will need:

8	jars	volume:	16	oz
2	produce bags	volume:	5	lbs

GoodFills

For this store, you will need:

Total:

6	jars	volume:	16	oz
1	produce bag	volume:	5	lbs

For each product:

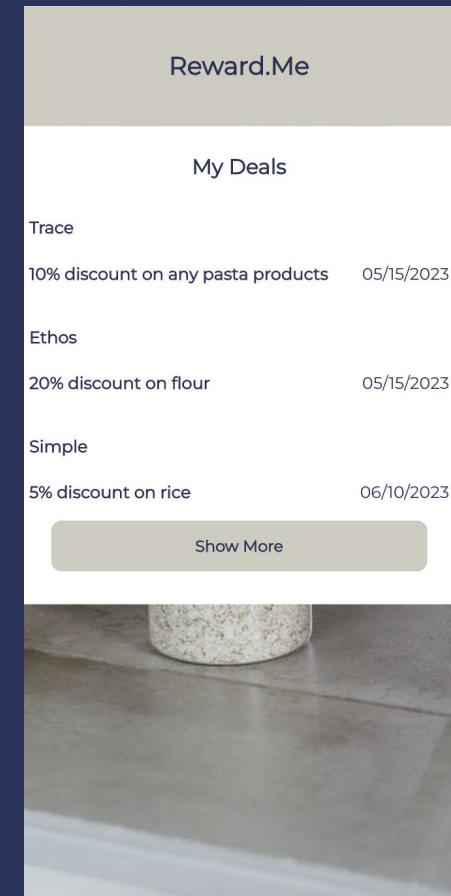
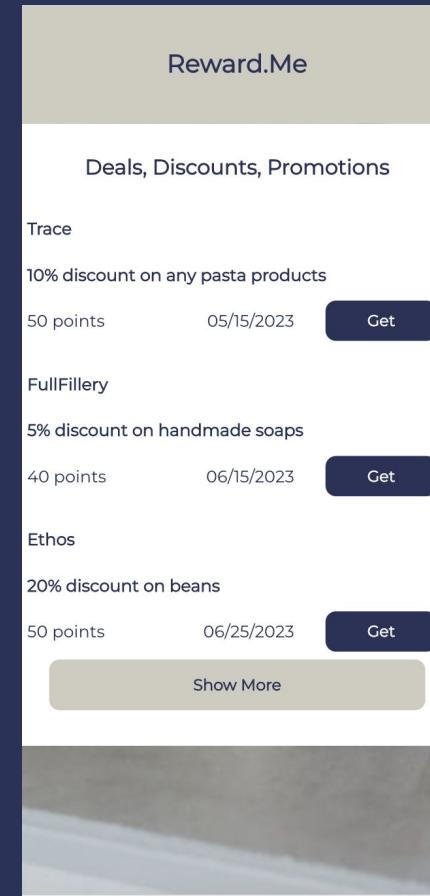
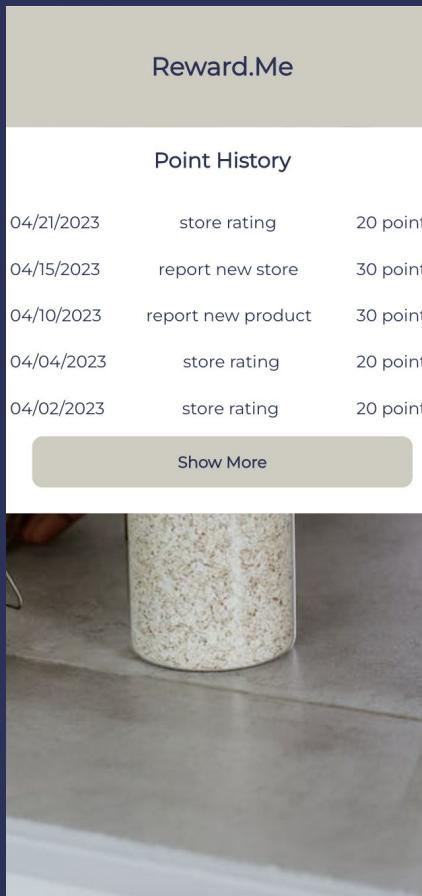
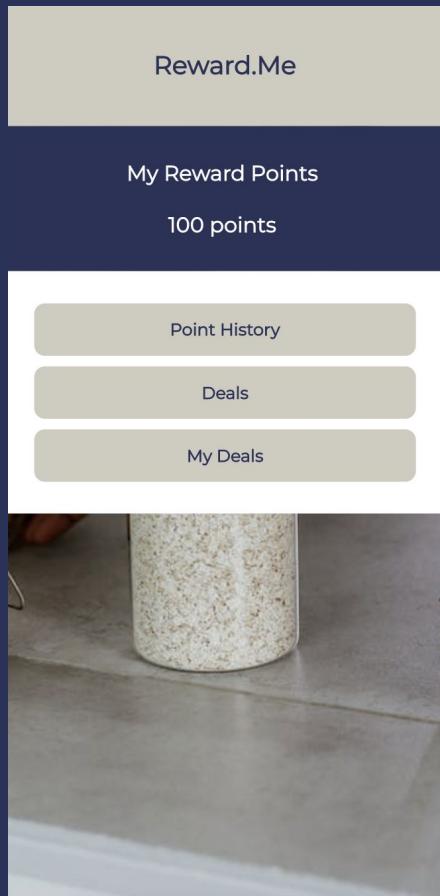
For penne (not organic) (2.5 lb)

3	jars	volume:	16	oz
---	------	---------	----	----

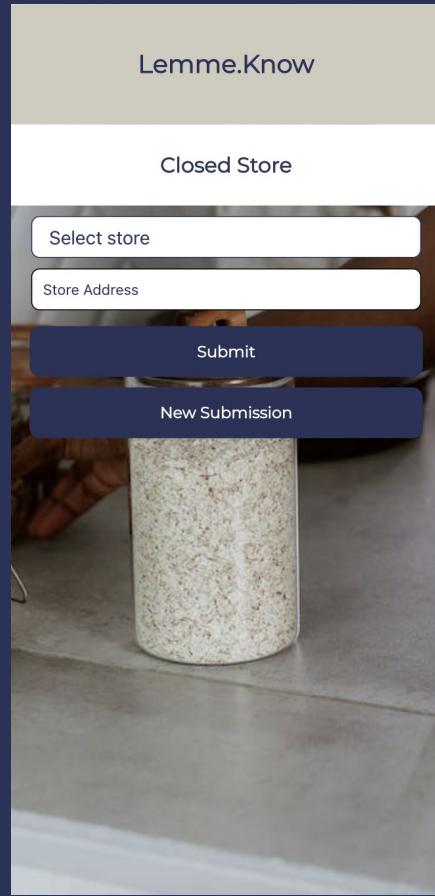
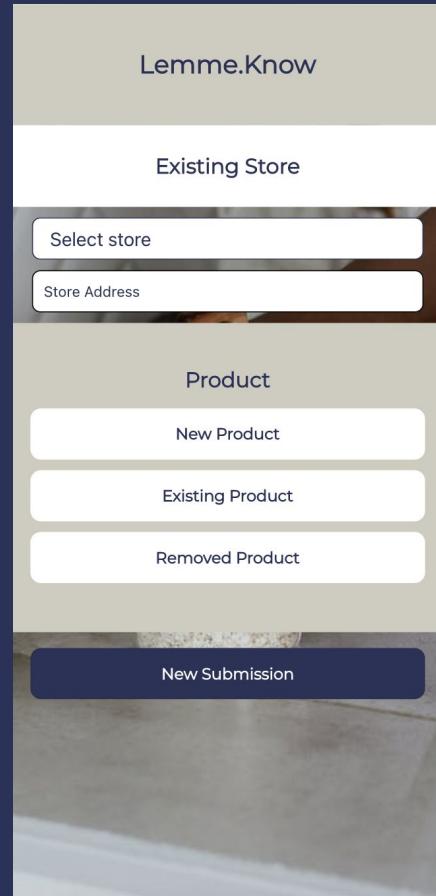
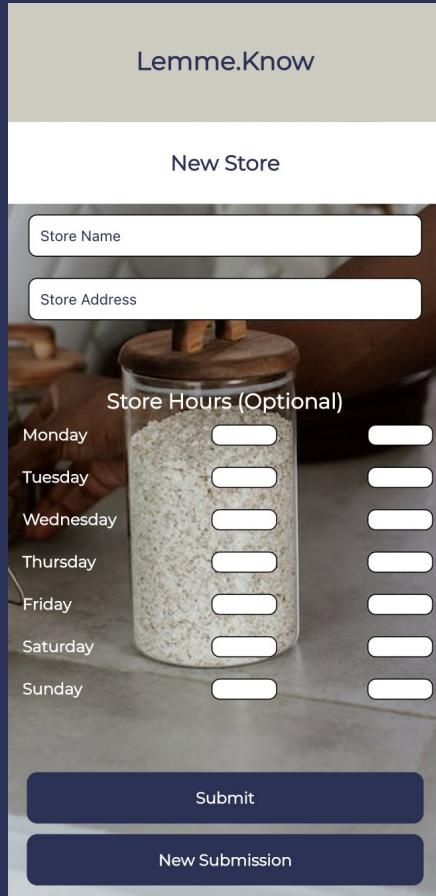
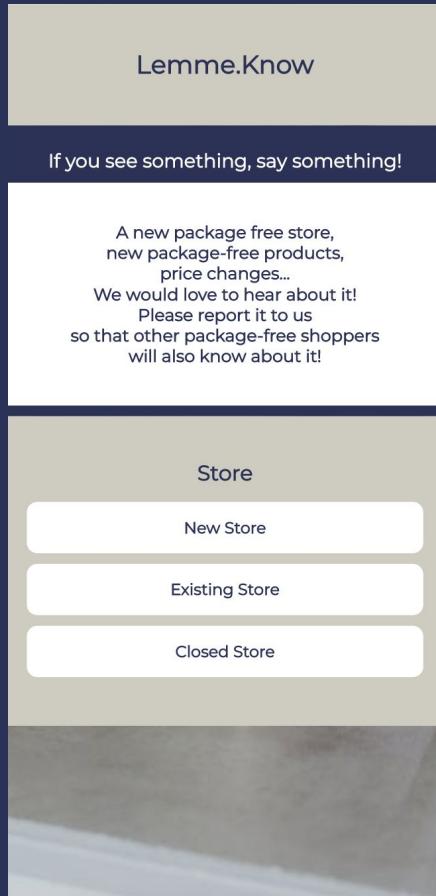
For farfalle (not organic) (2.5 lb)

3	jars	volume:	16	oz
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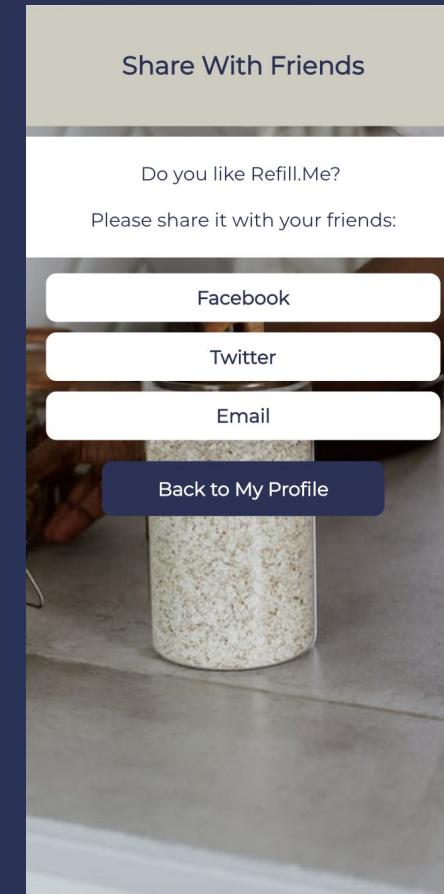
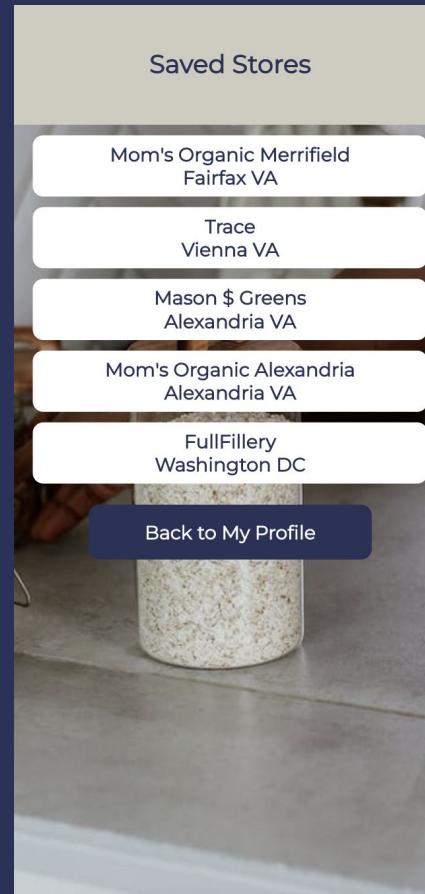
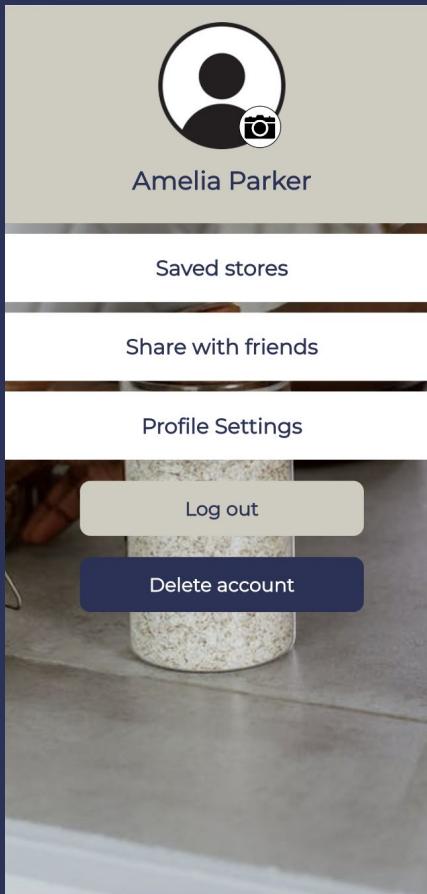
UI Screenshots: Reward.Me



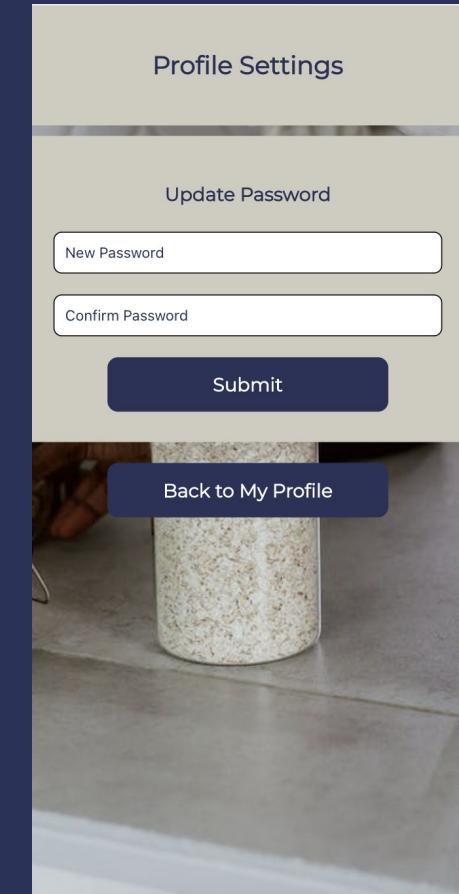
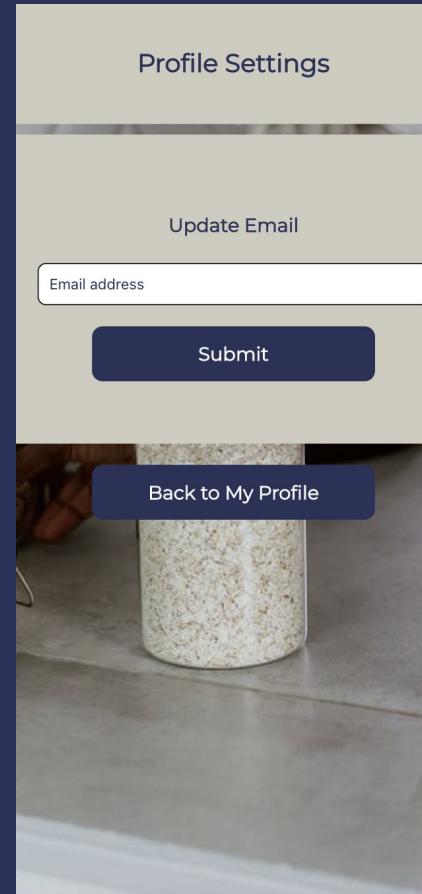
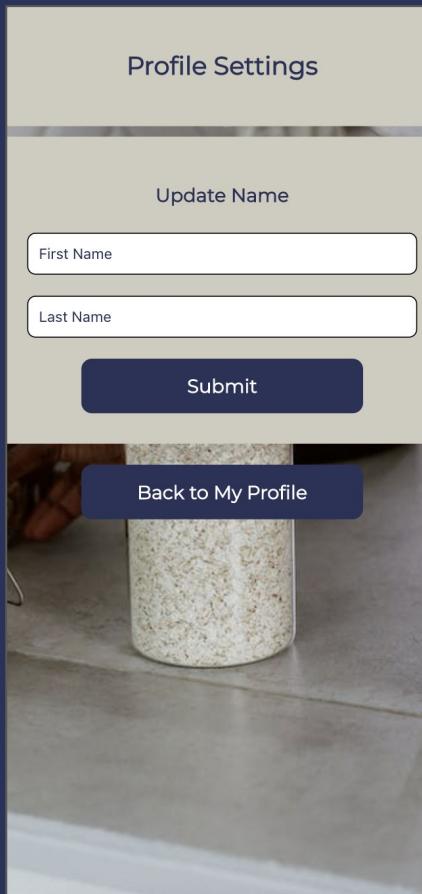
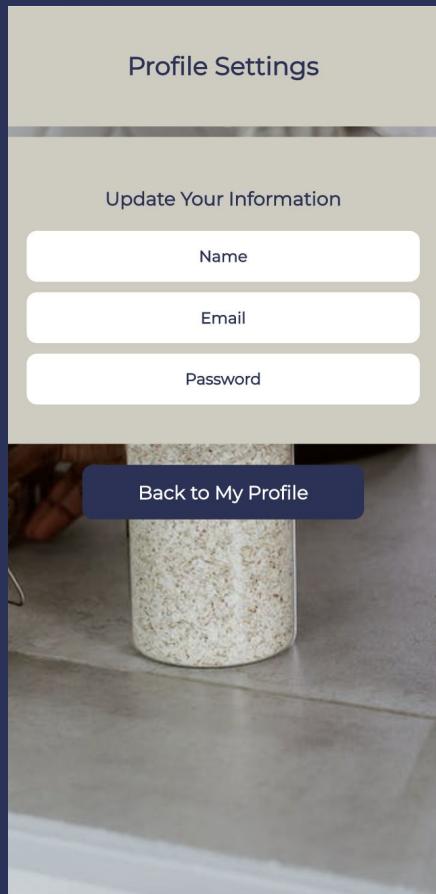
UI Screenshots: Lemme.Know



UI Screenshots: Profile and Profile Settings



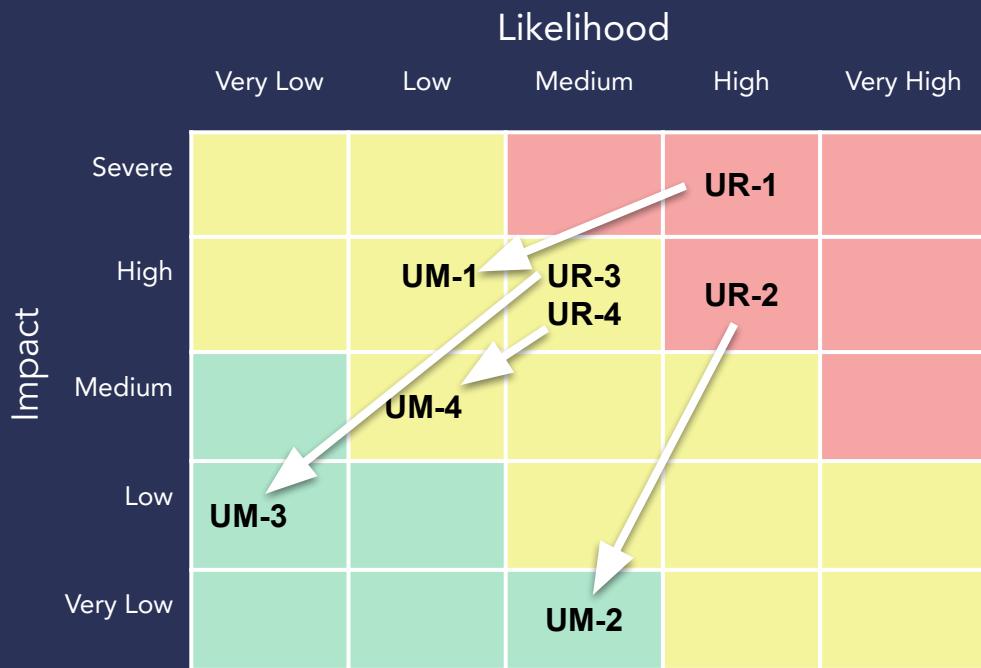
UI Screenshots: Profile and Profile Settings



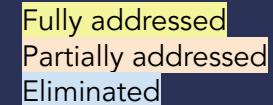
Legend:



User Risk Matrix



Legend



Risks

- UR-1: Shopper has no package-free stores in their area.
- UR-2: Shoppers are not familiar with needed containers
- UR-3: Shoppers are unable to do search by product or by Icon.
- UR-4: Shopper types in product' name and app returns no product available.

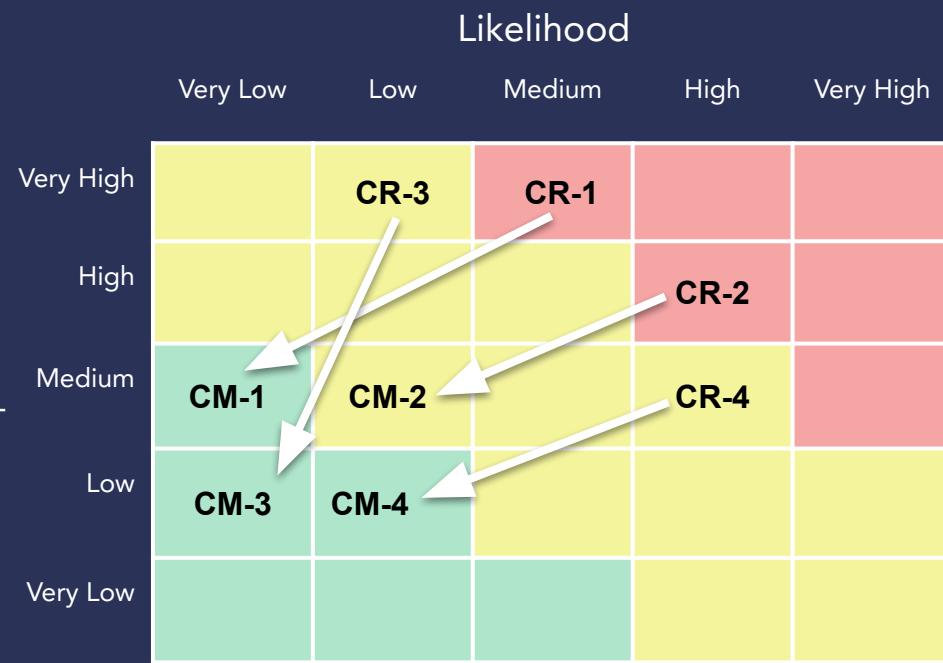
Mitigation

- UM-1: App connects shoppers to advocacy and petition sites.
- UM-2: App provides 'Container Guide'.
- UM-3: App provides 'Find by Product' & 'Find by Icon' features.
- UM-4: App lists related products.

Legend:

	low risk
	medium risk
	high risk

Customer Risk Matrix



Risks

Legend

	Fully addressed
	Partially addressed
	Eliminated

CR-1: Store unable to keep shoppers informed on available and out-of-stock items.

CR-2: Stores submit partial information for an item.

CR-3: Stores unable to keep shoppers engaged.

CR-4: Stores do not update Holiday hours.

Mitigation

CM-1: App allows to Store Owners to track and update items in their stores.

CM-2: App allow to correct partially-filled records on Products & Prices.

CM-3: App, Refill.Me offers discounts & rewards.

CM-4: Profile for Store Owners gives an option to update, Lemme.Know allows users to provide the feedback on incorrect information.

Legend:

	low risk
	medium risk
	high risk

Technical Risk Matrix

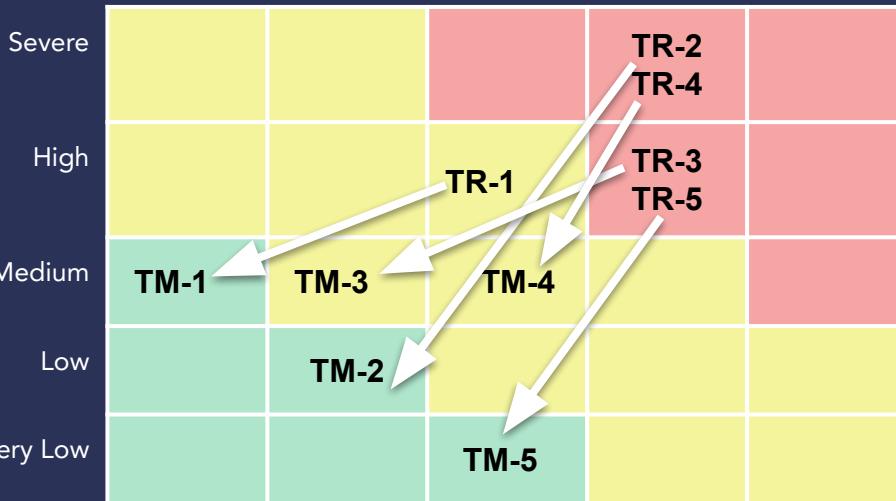
Risks

Legend

	Fully addressed
	Partially addressed
	Eliminated

Likelihood

Very Low Low Medium High Very High



- TR-1: Application is displaying partial content.
 TR-2: App lists wrong product or wrong price.
 TR-3: Credentials/data compromised.
 TR-4: API integration comes with technical complexities.
 TR-5: Mapping feature fails

Mitigation

- TM-1: Introduce cookies to improve the loading time.
 TM-2: DB of an app is on an automated scheduler that is updated once every 24 hrs; an error log in place for developers to track issues.
 TM-3: Use strong cybersecurity practices.
 TM-4: Studying API documentation, using an API Integration Platform.
 TM-5: An offline map of the closest 5 stores to the user will be saved.

Demonstration Plan

- ❖ Showcasing Refill.Me through the eyes of a shopper
 - Registering and Logging in
 - Looking up container information
 - Searching for stores
 - Searching for a specific product
 - Viewing items to the shopping list
 - Getting customized container recommendation based on the items in the shopping list
 - Getting information about advocacy and petition sites
 - Reporting a store that closed
 - Looking at the profile page and the saved stores
- ❖ Showcasing the code behind Refill.Me
 - Demonstration of backend code
 - Demonstration of frontend code



Refill.Me

No Waste, No Haste - Package-Free

Prototype Demonstration

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Appendix A: Next Steps

- ❖ Polish functionalities for shoppers
- ❖ Build functionalities for store owners
- ❖ Integrating Google Maps on the frontend
- ❖ Add navigation menu to shoppers & store owners
- ❖ Collect store data using web scraping

Appendix B: User Stories - Shoppers

As a package-free shopper, I want to...

- ❖ avoid purchasing products with wasteful product packaging so that I can help the environment.
- ❖ find nearby package-free stores so that I can do package-free shopping.
- ❖ learn about containers that I could use for package-free shopping so that I will know what containers I can use for package-free shopping.
- ❖ know what type of containers I will need to bring with me so that I can be prepared when I go package-free shopping.
- ❖ know how many containers I will need to bring with me so that I can do package-free shopping.
- ❖ search for specific package-free products near me in a quick and efficient way so that I will know what products are available package-free in my area.
- ❖ scan the barcode of a product so that I can find package-free alternatives for it.
- ❖ type in a product's name and search for it so that I will know what products are available package-free in my area.
- ❖ know the unit prices of products so that I will have information about the prices of products in advance.
- ❖ create a shopping list so that I will not forget anything that I would like to buy.
- ❖ have an overview of my reward points, and coupons I received, and their expiration date so that I can use them in time.
- ❖ redeem my reward points at the stores so that I can get some benefits.
- ❖ upload my receipts so that I can receive reward points for them.
- ❖ report new / closed stores, new products, or products that are not available anymore, or prices that changed so that I can help others with up-to-date information.
- ❖ rate stores so that I can provide some feedback about their services.
- ❖ provide feedback about the functionalities and the usage of the app so that the app will be optimized according to my needs.

Appendix B: User Stories - Stores

As a store owner/employee, I want to...

- ❖ efficiently edit / add / delete my store information, product listing, and prices so that the shoppers will see only up-to-date information regarding my store and products.
- ❖ see a preview of the data that I entered so that I can see what the shoppers will see in the app.
- ❖ see the store's site in the app from the user's view so that I can see what the shopper will see in the app.
- ❖ decide what products or services the users will get for a certain amount of reward points so that the shoppers can use their reward points.
- ❖ issue coupons to the shoppers for their reward points so that they will come to the store, and eventually buy other items, not just the one that the coupon is valid for.
- ❖ be able to accept the reward points and coupons earned by the shoppers so that they will come to my store and eventually buy other products too.
- ❖ receive reminders to update my information in the app so that I can provide up-to-date information to the shoppers.
- ❖ be notified in case any information is missing so that shoppers will find everything they need.
- ❖ be contacted when information about my store, my products, or my prices are reported by a user of the app so that I can verify it.
- ❖ be able to respond to store ratings so that I can provide my feedback regarding any comments or questions.
- ❖ receive information from the app regarding what products the users in my vicinity are searching for so that I can adjust my product offerings.

Appendix B: User Stories - Administrators

As an administrator, I want to...

- ❖ have access to all dashboards and user profiles so that I can make changes if needed.
- ❖ be able to add / update / delete accounts so that I can make changes if needed.
- ❖ have access to logs related to the app so that I can perform troubleshooting if needed.
- ❖ have data analytics tools so that I can see how the users of my app (both shoppers, and store owners) behave, what functionalities they use, etc.
- ❖ set up automatic notifications for the stores regarding updating their information and verifying crowdsourced data so that the app will always provide up-to-date information
- ❖ review information from the 'Contact Us' forms so that I can provide feedback regarding comments.
- ❖ respond to any questions posed in 'Contact Us' forms so that I can provide answers.
- ❖ perform necessary fixes and updates to the system so that the app will function as intended.
- ❖ use the best possible third party APIs, and if needed switch to a different API so that I can improve the app's performance.
- ❖ regularly do database data clean up so that I can improve efficiency and performance.
- ❖ be able to identify vulnerabilities in the app (for example, using DAST) so that I can improve the security of the app.



Thank you

Image source:

https://commons.wikimedia.org/wiki/File:USDA_is_working_hard_to_expand_access_to_farmers_markets_for_those_participating_in_the_Supplemental_Nutrition_Assistance_Program_%28SNAP%29.jpg



Q & A

Any questions?

Image source:

https://commons.wikimedia.org/wiki/File:USDA_is_working_hard_to_expand_access_to_farmers_markets_for_those_participating_in_the_Supplemental_Nutrition_Assistance_Program_%28SNAP%29.jpg