Lab 2 - Refill.Me Prototype Product Specification

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3.1.   Functional Requirements

3.1.1.   User Interface

3.1.1.1.   User Authentication

3.1.1.1.1.   Registration Screen (*O: Colombini, M1: Chang-Horvath, M2: Hull, M3:Wasikye*)

The Registration Screen shall have the following requirements in accordance with the Registration requirements (3.1.2.1.1):

3.1.1.1.1.1.   The registration screen shall display a form where depending on the role by selecting 'Shopper' or 'Store Owner' by choosing the corresponding button on the screen:

3.1.1.1.1.1.1.   Shopper enters his/her first name, last name, email, and password in order to create an account.

3.1.1.1.1.1.2.   Store owner enters his/her first name, last name, email, password; and in addition the store information (name of the store, store's address, website (if applicable), phone number, email address, opening hours).

3.1.1.1.1.2.   The registration screen shall specify the password requirements, informing the user about the

minimum length, and the special characters that can

be used (3.1.2.1.1.1.3).

3.1.1.1.1.3.   The registration screen shall validate user

passwords for strength and complexity and provide

feedback to users if they enter a weak password

(3.1.2.1.1.1.2 - 3.1.2.1.1.1.6).

3.1.1.1.1.4.   The registration screen shall require email

verification to ensure that the email address entered

by the user is valid and belongs to the user.

3.1.1.1.1.5.   The registration screen shall provide feedback to

users if they enter incorrect or incomplete

information, including error messages that are easy

to understand and actionable.

3.1.1.1.1.6.   The registration screen shall have a responsive

design that adjusts to the screen size and orientation

of the user's device.

3.1.1.1.1.7.   The registration screen shall have an appealing

design that aligns with the overall branding and

style of the application.

3.1.1.1.2.   Login Screen (*O: Colombini, M1: Chang-Horvath, M2:*

Hull, M3:Wasikye)

The login screen shall meet the following requirements in

accordance with Login algorithm requirements (3.1.2.1.2).

The login screen is identical for both shoppers and store owners:

3.1.1.1.2.1.   The login screen shall display the application's name and its logo.

3.1.1.1.2.2.   The login screen shall display the message 'Don't have an account?' and a 'Register' link (3.1.1.1.1).

3.1.1.1.2.3.   The login screen shall display a form with two fields, where the user shall enter his/her email address / username and password and 'Continue' button.

3.1.1.1.2.4.   The login screen shall display a message above the email field informing the user if the entered credentials are incorrect.

3.1.1.1.2.5.   The login screen shall display a link 'Forgot your password?' under the password field.

3.1.1.1.2.6.   The login screen shall display a 'Continue' button so that after the user enters their credentials, the user can log in to the application, and see their 'Home Screen' (3.1.1.2.1. and 3.1.1.3.1).

3.1.1.1.2.7.   The login screen shall have a responsive design that adjusts to the screen size and orientation of the user's device.

3.1.1.1.2.8.   The login screen shall have an appealing design that aligns with the overall branding and style of the application.

3.1.1.2.   Shopper Interface

3.1.1.2.1.   **Home Screen** (Shopper) (*O: Colombini, M1: Chang-Horvath*)

The user home screen shall meet the following requirements:

3.1.1.2.1.1.   The user home screen shall have a "Store Search" button that allows the user to access the "Store Search" screen (3.1.1.2.2) in order to search for nearby package-free stores.

3.1.1.2.1.2.   The user home screen shall have a "Product Search" button that allows the user to access the "Product Search" screen (3.1.1.2.3) in order to search for products.

3.1.1.2.1.3.   The user home screen shall have a "Container Guide" button that allows the user to access the "Container Guide" screen (3.1.1.2.4) in order to get information about the different containers utilized in package-free shopping.

3.1.1.2.1.4.   The user home screen shall provide a "Shopping List" button that allows the user to access the

"Shopping List" screen (3.1.1.2.5) in order to

create, manage, and edit their shopping list.

3.1.1.2.1.5.   The user home screen shall provide a "Reward.Me"

button that allows the user to access the

"Reward.Me" screen (3.1.1.2.7) in order to get

information about reward points collected, and

discounts / promotions offered by the stores.

3.1.1.2.1.6.   The user home screen shall have an "Advocacy and

Petition Sites" button that allows the user to access

the "Advocacy and Petition Sites" screen (3.1.1.2.8)

in order to find petitions related to package-free

shopping and to environmental issues.

3.1.1.2.1.7.   The user home screen shall have a "Lemme.Know"

button that allows the user to access the

"Lemme.Know" screen (3.1.1.2.9) in order to

submit information regarding new or closed stores,

new products, or products removed from a store's

offerings, or price changes.

3.1.1.2.1.8.   The user home screen shall display a navigation

menu that allows users easy access to different

screens of the application and includes the

following buttons:

3.1.1.2.1.8.1.   A "Home" button.

3.1.1.2.1.8.2.   A "Store Search" button.

3.1.1.2.1.8.3.   A "Product Search" button.

3.1.1.2.1.8.4.   A "Shopping List" button.

3.1.1.2.1.8.5.   A "Profile" button.

3.1.1.2.1.9.   The navigation menu described in requirement 3.1.1.2.1.8 shall be displayed on every screen, except on the login and the registration screen.

3.1.1.2.1.10.   The buttons 3.1.1.2.1.8.1 - 3.1.1.2.1.8.5 shall allow users to access the corresponding screens, providing a quick and efficient navigation between screens.

3.1.1.2.1.11.   The user home screen shall have a responsive design that adjusts to the screen size and orientation of the user's device.

3.1.1.2.1.12.   The user home screen shall have an appealing design that aligns with the overall branding and style of the application.

3.1.1.2.2. **Store Search** (*O: Rios, M1: Chang-Horvath, M2:Wasikye*) The store search screen shall display a full-screen map, leaving space at the bottom for the navigation bar.

3.1.1.2.2.1.   The store search screen shall display pins in the appropriate location on the map for each nearby store.

3.1.1.2.2.2.   The store search screen shall display the five (5) nearest stores with package-free options.

3.1.1.2.2.3.   For each store listing, a store information window shall open once the pin of the store is tapped. The window shall display the following information:

    3.1.1.2.2.3.1.   The store's name.

    3.1.1.2.2.3.2.   The store's address.

    3.1.1.2.2.3.3.   A "Details" button to provide more details about the store (3.1.1.2.2.4).

3.1.1.2.2.4.   The "Details" button for each listing shall open a full page providing store information as follows:

    3.1.1.2.2.4.1.   The store's name and address.

    3.1.1.2.2.4.2.   The store's average store rating.

    3.1.1.2.2.4.3.   A heart icon which when tapped, saves the store to the user's "Saved store" list (3.1.1.2.10.5).

    3.1.1.2.2.4.4.   The store's opening hours, listed for each day of the week.

    3.1.1.2.2.4.5.   The store's website (if applicable).

    3.1.1.2.2.4.6.   The store's phone number.

    3.1.1.2.2.4.7.   A "View Products" button that shall redirect the user to the product listing page with

results given for that specific store

(3.1.1.2.3.8).

      3.1.1.2.2.4.8.   A section with the header 'Rate Store',

below the header five light gray stars that

each turn yellow when the user taps on

them, and a 'Submit' button.

    3.1.1.2.2.5.   The detailed view for a store shall have a "Go

Back" button to return to the map results

(3.1.1.2.2.1).

    3.1.1.2.2.6.   The store search page shall be designed in a

responsive manner such that the content is properly

displayed on the user's screen, accounting for

orientation and resolution of the screen.

3.1.1.2.3.   **Product Search** (*O: Rios, M1: Chang-Horvath*)

    3.1.1.2.3.1.   The product search screen shall display two

different options for product search: "Search by

Icons" and "Enter Product Name".

    3.1.1.2.3.2.   Each of the two options mentioned in Requirement

3.1.1.2.3.1. shall have helpful text to describe the

capabilities of that search function to the user.

    3.1.1.2.3.3.   Once the "Search by Icons" option is selected, icons

of products representing the corresponding product

categories shall be displayed.

3.1.1.2.3.4.   Once the "Enter Product Name" option is selected, under the text "I am looking for", a text field shall be displayed where the user can enter the name of the product they look for.

3.1.1.2.3.5.   A loop icon shall be displayed in the text field described in requirement 3.1.1.2.3.4. Once the user clicks/taps on the loop icon, the application shall direct the user to the product listing page (3.1.1.2.3.8).

3.1.1.2.3.6.   Once the user searches for products in one of the two ways described in requirement 3.1.1.2.3.3 and 3.1.1.2.3.4, the products shall be displayed in a listing that has a title "Result for:" followed by the product's name.

3.1.1.2.3.7.   Every product that satisfies the search criteria and is available in nearby stores shall be displayed on the product listing page (3.1.1.2.3.8).

3.1.1.2.3.8.   Products shall be listed vertically in an infinitely scrolling list, grouped by store (displaying store name, city, and state).

    3.1.1.2.3.8.1.   To ensure good performance, products shall be loaded onto the end of the list in groups

of 10 as the user approaches the end of the
list.

3.1.1.2.3.8.2.   When the user reaches the end of the list, a
list bounce effect shall be played.

3.1.1.2.3.9.   The product listing page shall have a sorting
functionality indicated by a corresponding icon next
to the "Results for:" text. The sorting functionality
shall allow users to sort the products based on price,
distance, or product name.

3.1.1.2.3.10.   Each product listing shall consist of the following
information:

3.1.1.2.3.10.1.   The item title.

3.1.1.2.3.10.2.   The unit price of the item.

3.1.1.2.3.10.3.   A container icon to view the recommended
container for the specific product in a
pop-up dialog box.

3.1.1.2.3.10.4.   A button with a '+' sign to add the product
to the user's shopping list.

3.1.1.2.3.11.   The product listing page shall contain a "New
Search" button to redirect the user to the product
search page (3.1.1.2.3.1).

3.1.1.2.3.12.   The product search screen shall be designed in a
responsive manner such that the content is properly

displayed on the user's screen, accounting for

orientation and resolution of the screen.

3.1.1.2.4.   **Container Guide** (*O: Colombini, M1: Chang-Horvath*)

The Container Guide screen shall provide an overview of

the most common container types that can be used for

package-free shopping. The Container Guide screen shall

meet the following requirements:

3.1.1.2.4.1.   The Container Guide screen shall display the title

"Container Guide" at the top of the screen.

3.1.1.2.4.2.   The Container Guide screen shall display the

message "Get familiar with some of the containers

you can use to shop package-free!" directly beneath

the page title.

3.1.1.2.4.3.   The container guide screen shall display a listing of

different container types that can be used for

package-free shopping.

3.1.1.2.4.4.   Each entry in the listing for a container type shall

include:

- The container's name.

- The material(s) that the container can be

  made of.

- The listing of a few product categories that

  can be stored in the container.

- The image that shows the container.

3.1.1.2.4.5.   The container guide screen shall have a responsive

design that adjusts to the screen size and orientation

of the user's device.

3.1.1.2.4.6.   The container guide screen shall have an appealing

design that aligns with the overall branding and

style of the application.

3.1.1.2.5.   **Shopping List** (*O: Pathan, M1: Chang-Horvath*)

The Shopping List screen shall meet the following

requirements:

3.1.1.2.5.1.   The Shopping List screen shall be titled as "My

Shopping List" on the header of the screen.

3.1.1.2.5.2.   The "Shopping List" screen shall have the

following elements in each shopping list Item:

3.1.1.2.5.2.1.   Product name

3.1.1.2.5.2.2.   Unit Price

3.1.1.2.5.2.3.   Quantity

3.1.1.2.5.2.4.   A container icon to view the recommended

container for the specific product in a

pop-up dialog box.

3.1.1.2.5.2.5.   A button with a '-' sign to remove the

product from the user's shopping list.

3.1.1.2.5.3.   The Shopping List screen shall display products grouped by store.

3.1.1.2.5.4.   The Shopping List shall allow users the ability to scroll up/down depending on the number of shopping list items present on the screen.

3.1.1.2.5.5.   The Shopping List shall allow the increment or decrement of the quantity of any specific shopping list item by clicking/tapping on the up or down arrows located next to the quantity of each shopping list item.

3.1.1.2.5.6.   The Shopping List shall display a button titled "Container Recommendation" at the end of each store section.

3.1.1.2.5.7.   The Shopping List shall have functionality for the "Container Recommendation" button which directs the user to the Customized Container Recommendation screen (3.1.1.2.6).

3.1.1.2.5.8.   The Shopping List screen shall be responsive and organized based on the device used.

3.1.1.2.6.   Customized Container Recommendation (*O: Rios, M1: Hull, M2: Chang-Horvath*)

The container recommendation screen shall meet the following requirements:

3.1.1.2.6.1.   The container recommendation screen shall display

the title "Customized Container Recommendation"

at the top of the screen.

3.1.1.2.6.2.   The container recommendation screen shall display

a subheading "For this shopping, you will need:"

directly beneath the page title.

3.1.1.2.6.3.   The container recommendation screen shall display

a table of all the suggested containers based on the

products in the user's shopping list.

3.1.1.2.6.4.   Each row in the table described in requirement

3.1.1.2.6.3 shall display the following information:

3.1.1.2.6.4.1.   The product name, including product

specifications.

3.1.1.2.6.4.2.   The product amount.

3.1.1.2.6.4.3.   The number of containers needed for the

product.

3.1.1.2.6.4.4.   The type of container recommended for the

product.

3.1.1.2.6.4.5.   The material of the recommended container.

3.1.1.2.6.4.6.   The volume of the recommended container.

3.1.1.2.6.5.   Above the table specified in requirement

3.1.1.2.6.3, the system shall display the number and

the types of the containers that are recommended for the whole shopping, grouped by container types.

3.1.1.2.6.6.   Each entry in the table specified in requirement 3.1.1.2.6.5 shall include the following information:

3.1.1.2.6.6.1.   The number of containers recommended for the whole shopping.

3.1.1.2.6.6.2.   The types of containers recommended for the whole shopping.

3.1.1.2.6.6.3.   The material of the recommended containers.

3.1.1.2.6.6.4.   The volume of the recommended containers.

3.1.1.2.6.7.   The Customized Container Recommendation screen shall display a "Back to My Shopping List" button underneath the total table specified in Requirement 3.1.1.2.6.6.

3.1.1.2.6.8.   The "Back to My Shopping List" button shall redirect the user to the Shopping List screen (3.1.1.2.5).

3.1.1.2.6.9.   The Customized Container Recommendation screen shall be designed in a responsive manner such that the content is properly displayed on the user's screen, accounting for orientation and resolution of the screen.

3.1.1.2.7.   Reward.Me *(O: Chang-Horvath)*

3.1.1.2.7.1.   The Reward.Me screen shall display the title "Reward.Me" at the top of the screen.

3.1.1.2.7.2.   The Reward.Me screen shall display the number of reward points that the user currently holds.

3.1.1.2.7.3.   The Reward.Me screen shall display a button for "Reward Point History".

3.1.1.2.7.3.1.   The system shall display a "Reward Point History" table, showing the three latest entries, and a 'Show more' button, which when clicked will extend the table and display the whole reward point history.

3.1.1.2.7.3.1.1.   Each entry in the table specified in requirement 3.1.1.2.7.3.1 shall display the following information:

3.1.1.2.7.3.1.1.1.   The date when the reward point was received.

3.1.1.2.7.3.1.1.2.   The type of activity that was rewarded.

3.1.1.2.7.3.1.1.3.   The number of reward points earned.

3.1.1.2.7.4.   The Reward.Me screen shall display a table with the different deals and benefits that are offered in the

five nearest stores, the amount of reward points

needed for those deals, and the expiration date of

the offers. If no deals are available in nearby stores,

the system displays the message "No deals are

found nearby".

3.1.1.2.7.5.   The Reward.Me screen shall be designed in a

responsive manner on the user's screen, accounting

for orientation and resolution of the screen

3.1.1.2.8.   Advocacy and Petition Sites (*O: Pathan, M1: Hull, M2:*

Maximova, M3: Chang-Horvath)

The Advocacy and Petition Sites screen shall meet the

following requirements:

3.1.1.2.8.1.   The Advocacy and Petition Sites screen shall

display the title "Advocacy and Petition Sites" at

the top of the screen.

3.1.1.2.8.2.   The Advocacy and Petition Sites screen shall

display the message "Are you ready to take action?

Here are some useful links:" directly beneath the

page title.

3.1.1.2.8.3.   The Advocacy and Petition Sites screen shall

display a button for each Petition Site URL from the

database.

3.1.1.2.8.4.   The Advocacy and Petition Sites screen shall

display a button for each Advocacy Site URL from

the database.

3.1.1.2.8.5.   The Advocacy and Petition Sites screen shall be

organized by displaying buttons for advocacy sites,

and then the buttons for petition sites.

3.1.1.2.8.6.   The Advocacy and Petition Sites screen shall be

responsive and shall adjust to the user's device.

3.1.1.2.8.7.   The Advocacy and Petition Sites screen shall allow

user interaction with each button displayed by either

allowing a click or tap on the button from the user's

device.

3.1.1.2.8.8.   The Advocacy and Petition Sites screen shall open a

new browser window when a site button is

clicked/tapped on.

3.1.1.2.9.   **Lemme.Know** *(O: Chang-Horvath, M1: Hull,*

M2:Wasikye)

The system shall allow users to provide information about

new or closed stores, new or removed products, and price

changes.

3.1.1.2.9.1.   The Lemme.Know screen shall display the title

"Lemme.Know" at the top of the screen.

3.1.1.2.9.2. The Lemme.Know screen shall display the message

"A new package-free store, new package-free

products, price changes… We would love to hear

about it! Please report it to us so that other

package-free shoppers will also know about it!"

directly beneath the page title.

3.1.1.2.9.3. The Lemme.Know screen shall display a section

with the title "Store", and three buttons beneath it:

- New store

- Existing store

- Closed store

3.1.1.2.9.3.1. The system shall provide a form where users

can submit information regarding new stores

(store's name, address, opening hours) when

the "New store" button is tapped.

3.1.1.2.9.3.2. The system shall provide a form where users

can submit information regarding existing

stores (address change, change in opening

hours, new products, products removed from

the offering, price changes) when the

"Existing store" button is tapped.

3.1.1.2.9.3.3. The system shall provide a form where users

can submit information regarding closed

stores (store's name chosen from a

drop-down menu) when the "Closed store"

button is tapped.

3.1.1.2.9.3.4.   The system shall provide a "Submit" button

on each of the forms specified in 3.1.1.2.9.3.

3.1.1.2.9.3.5.   The Lemme.Know screen shall be

responsive and shall adjust to the user's

device.

3.1.1.2.10.   User Profile (Shopper) (*O: Colombini, M1:*

Chang-Horvath)

The system shall allow users to view and edit their personal

information to enter information, upload a photo, and make

changes to their profile and notification settings:

3.1.1.2.10.1.   The user profile screen shall display the user's name

which they used when they registered for the

application in the header of the screen.

3.1.1.2.10.2.   The user profile screen shall display a person icon

above the user's name in the header of the screen,

with a small camera icon right next to it.

3.1.1.2.10.3.   The user shall be able to upload a photo from their

device when they tap on the camera icon, in order to

use the photo as their profile picture.

3.1.1.2.10.4.   The user profile screen shall display three buttons

beneath the header:

- Saved stores

- Share with friends

- Profile settings

3.1.1.2.10.5.   Users shall be able to view their saved stores when

they tap on the "Saved stores" button.

3.1.1.2.10.6.   Users shall be able to share the application with

friends using email, Facebook, or Twitter when they

tap on the "Share with friends" button.

3.1.1.2.10.7.   Users shall be able to make modifications to their

profile settings (update name, update email address,

update password) when they tap "Profile settings".

3.1.1.2.10.8.   The user profile screen shall display a "Logout"

button at the bottom of the screen to allow the user

to log out of the application.

3.1.1.2.10.9.   The user profile screen shall display a "Delete

account" button at the bottom of the screen to allow

the user to delete their account. A message will

appear to prompt the user to confirm this action.

3.1.1.2.10.10.   The user profile screen shall have a responsive

design that adjusts to the screen size and orientation

of the user's device.

3.1.1.2.10.11.   The user profile screen shall have an appealing design that aligns with the overall branding and style of the application.

3.1.1.3.   Store Owner Interface

3.1.1.3.1.   **Home Screen** (Store Owner) (*O: Chang-Horvath*)

The user home screen shall meet the following requirements:

3.1.1.3.1.1.   The user home screen shall have a "Products & Prices" button that allows users to access the Products & Prices dashboard (3.1.1.3.2) in order to upload, modify, or delete products.

3.1.1.3.1.2.   The user home screen shall have a "Store Analytics" button that allows users to access the Store Analytics dashboard (3.1.1.3.3) in order to get up-to-date information about the store's performance.

3.1.1.3.1.3.   The user home screen shall have a "Reward Point Conversion" button that allows users to access the Reward Point Conversion dashboard (3.1.1.3.4) in order to add, modify, or delete reward point conversion entries.

3.1.1.3.1.4.   The user home screen shall provide a "Store Rating" button that allows the user to access the

Store Rating dashboard (3.1.1.3.5) in order to view the latest store ratings of the store.

3.1.1.3.1.5. The user home screen shall provide a "Store Search" button that allows the user to access the Store Search screen (3.1.1.2.2) in order to search for stores.

3.1.1.3.1.6. The user home screen shall have an "Product Search" button that allows users to access the Product Search screen (3.1.1.2.3) in order to search for products.

3.1.1.3.1.7. The user home screen shall have a "Profile" button that allows the user to access their User Profile screen (3.1.1.3.8) in order to view and edit information related to their store.

3.1.1.3.1.8. The user home screen shall display a navigation menu that allows the user easy access to different areas of the application and includes the following buttons:

3.1.1.3.1.8.1. A "Home" button.

3.1.1.3.1.8.2. A "Products & Prices" button.

3.1.1.3.1.8.3. A "Reward Point Conversion" button.

3.1.1.3.1.8.4. A "Store Analytics" button.

3.1.1.3.1.8.5. A "Profile" button.

3.1.1.3.1.9.   The navigation menu described in requirement

3.1.1.3.1.8 shall be displayed on every screen,

except on the login and the registration screen.

3.1.1.3.1.10.   The buttons 3.1.1.3.1.8.1 - 3.1.1.3.1.8.5 shall allow

the user to access the corresponding screens,

providing a quick and efficient navigation between

screens.

3.1.1.3.1.11.   The user home screen shall have a responsive

design that adjusts to the screen size and orientation

of the user's device.

3.1.1.3.1.12.   The user home screen shall have an appealing

design that aligns with the overall branding and

style of the application.

3.1.1.3.2.   Products & Prices (*O: Chang-Horvath, M1: Maximova*)

3.1.1.3.2.1.   The Products & Prices screen shall display the title

"Products & Prices" at the top of the screen.

3.1.1.3.2.2.   The Products & Prices screen shall display a table

that contains information about the products offered

by the store.

3.1.1.3.2.3.   Each row in the table described in the requirement

3.1.1.3.2.2 shall display the following information:

3.1.1.3.2.3.1.   The product's name.

3.1.1.3.2.3.2.   The product specification.

3.1.1.3.2.3.3.   The information whether the product is

organic or not.

3.1.1.3.2.3.4.   The product ID.

3.1.1.3.2.3.5.   The product category.

3.1.1.3.2.3.6.   The price of the product.

3.1.1.3.2.3.7.   The unit for the price of the product.

3.1.1.3.2.3.8.   An icon for editing the information in that

particular row.

3.1.1.3.2.3.9.   An icon for deleting the product in that

particular row.

3.1.1.3.2.4.   Above the table specified in requirement

3.1.1.3.2.2, the system shall display an "Add

product" button that allows the user to add a new

entry to the Products & Prices table.

3.1.1.3.2.5.   The Products & Prices screen shall be designed in a

responsive manner on the user's screen, accounting

for orientation and resolution of the screen.

3.1.1.3.3.   Store Analytics (*O: Chang-Horvath, M1: Hull*)

3.1.1.3.3.1.   The Store Analytics screen shall display the title

"Store Analytics" at the top of the screen.

3.1.1.3.3.2.   The Store Analytics screen shall display a table that

contains information about all recent searches done

by shoppers in the store's area.

3.1.1.3.3.3.   Each row in the table described in the requirement

3.1.1.3.3.2 shall display the following information:

3.1.1.3.3.3.1.   The name of the product that was searched

for.

3.1.1.3.3.3.2.   The information whether the product was

found in the area or not, represented by

checkmarks when product is found in the

area, and an 'x' when product is not found in

the area.

3.1.1.3.3.3.3.   The date when the product search took

place.

3.1.1.3.3.3.4.   The information whether the product is

available in the store owner's store or not,

represented by checkmarks when product is

found in the area, and an 'x' when product is

not found in the area.

3.1.1.3.3.3.5.   A "Save" button that allows the store owner

to save the entry and retrieve it later. When

the "Save" button is tapped, it changes color

from white to dark blue.

3.1.1.3.3.4.   Beneath the table specified in requirement

3.1.1.3.3.2, the system shall display a "See Full

Listing" button that allows the user to view all

recent search entries.

3.1.1.3.3.5.   Beneath the table specified in requirement

3.1.1.3.3.2, the system shall display a "See Saved

Searches" button that allows the user to view all

saved search entries.

3.1.1.3.3.6.   The Store Analytics screen shall be designed in a

responsive manner on the user's screen, accounting

for orientation and resolution of the screen.

3.1.1.3.4.   Reward Point Conversion (*O: Chang-Horvath*)

3.1.1.3.4.1.   The Reward Point Conversion screen shall display

the title "Reward Point Conversion" at the top of

the screen.

3.1.1.3.4.2.   The Reward Point Conversion screen shall display a

table that contains information about the product or

service that can be obtained by the shoppers in

exchange for a certain number of reward points.

3.1.1.3.4.3.   Each row in the table described in the requirement

3.1.1.3.4.2 shall display the following information:

3.1.1.3.4.3.1.   The description of the product or service

that is being offered by the store.

3.1.1.3.4.3.2.   The amount of reward points that the

shopper would need to use in order to get

the product or service.

3.1.1.3.4.3.3.   The expiration date of the offer.

3.1.1.3.4.3.4.   An icon for editing the information in that

particular row.

3.1.1.3.4.3.5.   An icon for deleting the product in that

particular row.

3.1.1.3.4.4.   Above the table specified in requirement

3.1.1.3.4.2, the system shall display an "Add

conversion" button that allows the user to add a new

entry to the table.

3.1.1.3.4.4.1.   Store owners/employees shall be able to

specify the following regarding a new

reward point conversion that they would like

to enter:

- Name of product or service

- Reward points needed for the product

or service

- Expiry date

3.1.1.3.4.4.2.   Store owners/employees shall be able to edit

or delete the reward point conversion entries

that are in the Reward Point Conversion

dashboard.

3.1.1.3.4.5.   The Reward Point Conversion screen shall be

designed in a responsive manner on the user's

screen, accounting for orientation and resolution of

the screen.

3.1.1.3.5.   Store Rating (*O: Chang-Horvath, M1: Hull*)

3.1.1.3.5.1.   The Store Rating screen shall display the title "Store

Rating" at the top of the screen.

3.1.1.3.5.2.   The Store Rating screen shall display a field with

the text "Overall Rating", and the average rating of

the store based on all previous ratings submitted by

the users.

3.1.1.3.5.3.   The Store Rating screen shall display a "Recent

Store Ratings" table that contains information about

the most recent store ratings received by the store.

3.1.1.3.5.4.   Each row in the table described in the requirement

3.1.1.3.5.2 shall display the following information:

3.1.1.3.5.4.1.   The rating that the store received.

3.1.1.3.5.4.2.   The date when the rating was received.

3.1.1.3.5.5.   Beneath the table specified in requirement

3.1.1.3.5.2, the system shall display an "See more"

button that allows the user to see more, older store

rating' entries.

3.1.1.3.5.6.   The Store Rating screen shall be designed in a

responsive manner on the user's screen, accounting

for orientation and resolution of the screen.

3.1.1.3.6.   Store Search (*O: Chang-Horvath*)

3.1.1.3.6.1.   The system shall display a "Store Search" page

identical to that in requirement 3.1.1.2.2.

3.1.1.3.7.   Product Search (*O: Chang-Horvath*)

3.1.1.3.7.1.   The system shall display a "Store Search" page

identical to that in requirement 3.1.1.2.3.

3.1.1.3.8.   User Profile (Store Owner) (*O: Chang-Horvath*)

The system shall allow users to view and edit their store's

information to enter information, upload a photo, and make

changes to their profile and notification settings

3.1.1.3.8.1.   The user profile screen shall display the store's

name which is associated with the account.

3.1.1.3.8.2.   The user profile screen shall display a person icon

above the store's name in the header of the screen,

with a small camera icon right next to it.

3.1.1.3.8.3.   The user shall be able to upload a photo from their

device when they tap on the camera icon, in order to

use the photo as the store's profile picture.

3.1.1.3.8.4.   Beneath the header, the user profile screen shall

display a field with the following Store Information

(based on the registration form):

- Address

- Hours

- Website

- Phone

3.1.1.3.8.5.   The store information in the field specified in

3.1.1.3.8.4 shall be editable by the user.

3.1.1.3.8.6.   The user profile screen shall display three buttons

beneath the header:

- Profile settings

- Notification settings

- Roles & Permissions

3.1.1.3.8.7.   The store owners/employees shall be able to make

modifications to the profile settings (update name,

update email address, update password) when they

tap "Profile settings".

3.1.1.3.8.8.   The store owners/employees shall be able to make

modifications to the notifications settings when they

tap "Notification settings".

3.1.1.3.8.9.   The store owners/employees shall be able to make

modifications to the roles and permission held by

each employee when they tap the "Roles &

Permissions" button.

3.1.1.3.8.10.   The user profile screen shall display a "Logout"

button at the bottom of the screen to allow the user

to log out of the application.

3.1.1.3.8.11.   The user profile screen shall display a "Delete

account" button at the bottom of the screen to allow

the user to delete their account. A message will

appear to prompt the user to confirm this action.

3.1.1.3.8.12.   The user profile screen shall have a responsive

design that adjusts to the screen size and orientation

of the user's device.

3.1.1.3.8.13.   The user profile screen shall have an appealing

design that aligns with the overall branding and

style of the application.

3.1.2.   Algorithms

3.1.2.1.   Account Management

3.1.2.1.1.   Registration (*O: Colombini, M1: Chang-Horvath*)

3.1.2.1.1.1.   The system shall allow users to create an account on

the registration screen (3.1.1.1.1). The following

requirements shall be met:

3.1.2.1.1.1.1.   Registration process: The system shall

provide a registration process for users to

create a new account, which includes

collecting basic information:

- For shoppers:
  - first name
  - last name
  - email
  - password
- For shoppers
  - same basic information as for shoppers (name, email, password)
  - store information
  - store's name
  - store's address
  - website (if applicable)
  - phone
  - opening hours

3.1.2.1.1.1.2. Validation: The system shall validate the users' inputs and ensure that all required fields are completed before creating a new account.

3.1.2.1.1.1.3. Password requirements: The system shall enforce password requirements to ensure

that passwords are strong and secure,

including minimum length, complexity, and

character types. (3.1.2.1.1.1.3.2)

3.1.2.1.1.1.3.1.   The system shall store the

password's hash in the database.

3.1.2.1.1.1.3.2.   The system shall accept the

password and store it in the database

when the following requirements are

met:

3.1.2.1.1.1.3.2.1.   The password shall have a

length of minimum 8

characters.

3.1.2.1.1.1.3.2.2.   The password shall contain at

least one uppercase letter.

3.1.2.1.1.1.3.2.3.   The password shall contain at

least one number.

3.1.2.1.1.1.3.2.4.   The password shall contain at

least one special character.

3.1.2.1.1.1.4.   User authentication: The system shall

authenticate user's information during the

account creation process to ensure that only

authorized users can create a new account.

3.1.2.1.1.1.5.   Account confirmation: The system shall

provide a confirmation mechanism to verify

the user's email address and activate the

new account.

3.1.2.1.1.1.6.   Error handling: The system shall handle

errors that may occur during the account

creation process, such as incorrect inputs or

server errors.

3.1.2.1.1.1.7.   User profile: The system shall create a user

profile for each new account, which includes

basic information such as first name, last

name, and email address. The information

related to the user profile shall be stored in

the database.

3.1.2.1.1.1.8.   Security: The system shall store account

information in the database securely to

prevent unauthorized access or modification

(3.4.2).

3.1.2.1.2.   Login *(O: Colombini, M1: Chang-Horvath, M2: Hull)*

3.1.2.1.2.1.   The login procedure shall be secure and require

users to enter their username / email and password

to authenticate their identity before gaining access

to the application.

3.1.2.1.2.2.   The username / email address entered by the user shall match an existing username / email address in the database.

3.1.2.1.2.3.   The hash of the entered password shall match the stored password hash for the specified email address (3.1.2.1.1.1.3.1).

3.1.2.1.2.4.   The application shall provide feedback to users if they enter incorrect login credentials, including error messages that are easy to understand and actionable.

3.1.2.1.2.5.   After the user logged in, the application shall prompt the user to choose his/her preferences regarding enabling location services (happens on the first time login to the application, or on multiple occasions, depending on user's device settings):

- Allow once

- Allow while using app

- Don't allow

3.1.2.1.3.   Password Reset *(O: Chang-Horvath, M1: Hull)*

3.1.2.1.3.1.   Once the user chooses the "Forgot your password?" link on the login screen (3.1.1.2.5.), the system shall send an email with a reset link to the email address provided by the user.

3.1.2.1.3.2.   The link specified in the email shall direct the user

to a password reset page where the requirements for

a new password are displayed (3.1.2.1.1.1.3.2.).

3.1.2.1.3.3.   The password reset page shall verify that the

password satisfies all the requirements (length,

number of uppercase letters, number of digits, and

number of special characters, specified in

requirement 3.1.2.1.1.1.3.2).

3.1.2.1.3.4.   The password reset page shall verify that the new

chosen password is not identical to the old

password.

3.1.2.2.   **Store Search** *(O: Chang-Horvath)*

The system shall allow users to search for stores based on their

current location, or based on the zip code that they provided.

The following requirements must be met:

3.1.2.2.1.   Store search based on the user's current location

3.1.2.2.1.1.   The system shall determine the user's current

location via GPS if the user enabled location

services.

3.1.2.2.1.2.   The system shall determine the ZIP code of the area

based on the user's current location.

3.1.2.2.1.3.   The system shall return the five nearest stores from the database based on the ZIP code that was determined in 3.1.2.2.1.2.

3.1.2.2.2.   Store search based on ZIP code provided by the user

3.1.2.2.2.1.   The system shall return the five nearest stores from the database based on the ZIP code that is provided by the user.

3.1.2.2.3.   The system shall display the stores determined in 3.1.2.2.1.1 or 3.2.2.2.2 on an interactive online map from where the users can get further information about the stores (3.1.1.2.2.1).

3.1.2.3.   Product Search (*O: Colombini, M1: Maximova, M2: Chang-Horvath*)

The system shall enable users to perform a location-based search for specific package-free products in their vicinity. The system should present the search results in a prompt and efficient manner (3.1.1.2.3.7). The following requirements must be met:

3.1.2.3.1.   Product search based on icons

3.1.2.3.1.1.   The system shall allow users to tap on the icon of a product category (screen specified in 3.1.1.2.3.3).

3.1.2.3.2.   Product search based on entering the product's name

3.1.2.3.2.1.   The system shall allow users to enter the product's

name for which they are searching for (screen

specified in 3.1.1.2.3.4)

3.1.2.3.3.   Product search based on location

3.1.2.3.3.1.   Product search based on the user's current location

3.1.2.3.3.1.1.   The system shall determine the ZIP code

based on the user's current location.

3.1.2.3.3.1.2.   Based on the user's product choice in

3.1.2.3.1. or 3.1.2.3.2, and the ZIP code

determined in 3.1.2.3.3.1.1, the system shall

return the five nearest stores from the

database where the product that is being

searched for can be found.

3.1.2.3.3.2.   Product search based on ZIP code provided by the

user

3.1.2.3.3.2.1.   Based on the user's product choice in

3.1.2.3.1. or 3.1.2.3.2, and the ZIP code

provided by the user, the system shall return

the five nearest stores from the database

where the product that is being searched for

can be found.

3.1.2.3.3.3.   The system shall display the stores' names that were

determined in 3.1.2.3.3.1 or 3.1.2.3.3.2, the

products' name, and the prices of the products in a

product listing according to the Product Search

screen requirements (3.1.1.2.3).

3.1.2.4.   **Shopping List** (*O: Colombini, M1: Chang-Horvath)*

The system shall allow the user to add items to the built-in

shopping list to keep track of the items that they want to buy

(3.1.1.2.5). The following requirements shall be met:

3.1.2.4.1.   The system shall allow the user to add products from the

product listing (3.1.1.2.3.7) to the shopping list.

3.1.2.4.2.   The system shall display a default quantity when a product

is added to the shopping list.

3.1.2.4.3.   The system shall allow the user to update the products'

quantities that are in the shopping list using the up and

down arrows described in requirement 3.1.1.2.5.5.

3.1.2.4.4.   The system shall allow the user to remove products from

the shopping list using the button with the '-' sign

(3.1.1.2.5.2.5).

3.1.2.4.5.   The system shall allow the user to retrieve their shopping

list at any time by choosing the "Shopping List" button in

the navigation menu (3.1.1.2.1.8.4).

3.1.2.5. **Customized Container Recommendation** (*O: Colombini, M1: Chang-Horvath)*

The system shall provide the capability to display the number and the types of the containers needed for a shopping based on the user's shopping list (3.1.2.4). The system shall determine the number and the types of the recommended containers for each product based on the product's product category, and the quantity that the user would like to buy from that specific product. The following requirements shall be met:

3.1.2.5.1. The system shall calculate the number of containers for each product in the user's shopping list based on the product and the quantity.

3.1.2.5.2. The system shall determine the types of containers for each product in the user's shopping list based on the product's product category.

3.1.2.5.3. The system shall calculate the number of containers needed for the whole shopping (for all products, at all stores), and display it grouped by container types.

3.1.2.5.4. The system shall calculate the quantities of containers needed for specific products, and for the shopping at each store (overall).

3.1.2.5.5.   The system shall display the information specified in the

3.1.2.5 following the requirements for the Customized

Container Recommendation screen (3.1.1.2.6).

3.1.2.6.   Reward.Me (*O: Chang-Horvath*)

The system shall allow shoppers to collect, view, and redeem

reward points. The following requirements shall be met:

3.1.2.6.1.   Point balance: The system shall display the amount of

points that the user currently has.

3.1.2.6.2.   Point collection: The system shall allow the shoppers to

receive reward points for submitting information via the

"Lemme.Know" feature (3.1.1.2.9, 3.1.2.8) and for

submitting a store rating (3.1.1.2.2.4.8, 3.1.2.7.1.5).

3.1.2.6.3.   Point redemption: The system shall allow the shoppers to

redeem their points for benefits specified by the stores.

3.1.2.7.   Store Rating (*O: Chang-Horvath, M1:Colombini*)

Shoppers shall access the Store Rating feature from a specific

store's page (after the user chose "Details" in the store information

window on the interactive online map) (3.1.1.2.2.4.8). Store

owners shall view their store ratings in the "Store Rating" screen

(3.1.1.3.5).

3.1.2.7.1.   **Store Rating Algorithm for Shopper**

3.1.2.7.1.1.   The system shall enable the user to select the 'Rate Store' feature on any store's page, as specified in requirement 3.1.1.2.2.4.8.

3.1.2.7.1.2.   The system shall allow the user to rate a store on a numerical scale from 1 to 5, inclusive.

3.1.2.7.1.3.   The system shall allow the user to submit their rating for the selected store.

3.1.2.7.1.4.   The system shall calculate and display the average rating for each store based on all the submitted ratings on each store's page (3.1.1.2.2.4.8).

3.1.2.7.1.5.   The system shall give reward points to the users for submitting store ratings.

3.1.2.7.2.   **Store Rating Algorithm for Store Owner**

3.1.2.7.2.1.   The system shall calculate and display the average rating for the store owner's store based on all the ratings submitted by the shoppers.

3.1.2.8.   **Lemme.Know** (*O: Chang-Horvath, M1:Maximova, M2: Wasikye*) The system shall allow users to report new or closed stores, new or removed products, and price changes.

3.1.2.8.1.   The system shall allow the user to submit product information using the form specified in requirement 3.1.1.2.9 only if the store information is filled in.

3.1.2.8.2.   The system shall allow the user to submit price information using the form specified in requirement 3.1.1.2.9 only if the store and product information is filled in.

3.1.2.8.3.   The system shall not allow the user to submit product or price information using the form specified in requirement 3.1.1.2.9 if the user reports information regarding a store that has permanently closed.

3.1.2.8.4.   The system shall store the information submitted by the user in a designated data table in the database.

3.1.2.8.5.   The system shall contact the stores using the contact information stored in the database in order to verify the accuracy of the information submitted by the users.

3.1.2.8.6.   After the inquiry is validated by the store, the system shall update the information in the database.

3.1.2.8.7.   After the inquiry is validated by the store, the system shall give reward points to the users for submitting information via the Lemme.Know feature.

3.1.2.9.   **Product Upload** (*O: Chang-Horvath, M1: Maximova*)

The system shall allow store owners/employees to enter the information of products that are available in their store using the "Products & Prices" dashboard (3.1.1.3.2).

3.1.2.9.1.   Store owners/employees shall be able to specify the

following regarding a new product that they would like to

enter:

- Product name, and specifications

- Product ID

- Product category

- Price of the product

- Unit of the product

3.1.2.9.2.   Store owners/employees shall be able to edit or delete the

products that they previously entered into the system

(3.1.1.3.2).

3.1.2.9.3.   To avoid duplications, an error message shall appear if the

store owner/employee attempts to add an item that is

already in the system.

3.1.2.10.   **Store Analytics** *(O: Chang-Horvath)*

3.1.2.10.1.   The system shall retrieve data from the database regarding

the shoppers' product searches based on the metadata

collected by the application about the users' interactions

with the application.

3.1.2.10.2.   The Store Analytics page shall display the user's product

searches from the five stores nearest to them based on the

current store's address.

3.1.2.10.3. The system shall display the information in a table

specified in the requirement 3.1.1.3.3.

3.1.2.11. **Reward Point Conversion** (*O: Chang-Horvath*)

3.1.2.11.1. The system shall allow store owners/employees to add,

modify, and delete information regarding the amount of

points that are needed for certain products or services at the

store.

3.1.2.11.2. The information in the Reward Point Conversion table is

displayed according to the requirements in 3.1.1.3.4.

3.1.2.11.3. The information in the Reward Point Conversion table is

communicated to the shoppers via the "Reward.Me" screen

(3.1.1.2.7.4).

3.2. **Performance Requirements**

3.2.1. **Performance** (*O: Maximova, M1: Pathan*)

Refill.Me landing page shall support 3000 users per hour and must provide

3 seconds or less response time in desktop or mobile, including the

rendering of text, images, and data grids. Additional settings:

- It shall allow notifications from other apps to appear on top of the

Refill.Me app.

- During the use of the application, no shutting down, system overheating,

or CPU throttling shall happen.

3.2.2.   **Scalability** (*O: Maximova*)

Refill.Me application shall be scalable to support 1000 users while maintaining the optimal performance.

3.2.3.   **Usability & Compatibility** (*O: Maximova, M1: Hull, M2: Chang-Horvath*)

The application shall keep users informed about new store listings, updated store hours, and new or seasonal items through appropriate feedback within 24 - 48 hours time.

A notification message shall inform users if the device is not compatible with the app such as; the memory space is not enough; OS is not supported.

The application is not guaranteed to work properly if the device OS is older than the supported operating systems (iOS: shall support Mojave and higher; Android: shall support pie and higher; Windows: shall support 7 and higher).

The application shall request access to the camera if the user decides to upload an image from their device to their profile.

3.2.4.   **Localization** (*O: Maximova, M1: Hull*)

The application shall be available for users who reside in the United States; outside the US users won't be able to perform Store Searches (US territories won't be available in version 1.0 release).

3.2.5.   **Maintainability** (*O: Maximova*)

The application shall be available to users at all times unless a scheduled

maintenance is in place; messages would be coming from Developers and

users will be informed well in advance.

3.2.6.   **Availability** (*O: Maximova*)

Users shall be able to access and use the application at all times and with

reliable access; preserving the access control and disclose restrictions on

information.

Administrators shall have the right to block the user if the user violates the

integrity and/or Honor of the application.

3.3.   **Assumptions and Constraints** (O: *Maximova, M1: Hull, M2: Chang-Horvath*)

The application shall require an internet connection for timely results

retrievals: store search, product search, container recommendations, etc.

Additionally:

- Shoppers shall use a mobile device, preferably a smartphone in order to

  maximize the benefits offered by the app.

- Store owners shall use a mobile device, preferably a tablet in order to

  maximize the benefits offered by the app.

- No maintenance updates shall occur during the weekdays.

- Users shall have a stable network connection for a delay-free experience.

- The application shall be accessible only to fifty (50) U.S. states including

  Washington D.C.; no U.S. territories at this time.

- Only United States official holidays shall be recognized by the application.

- Items presented by Refill.Me shall focus primarily on high demand package-free produce.

- The application is not guaranteed to work properly if the device OS is older than the supported operating systems (3.2.3).

- The application's databases and information shall be set in UTC/EST time.

- To browse the application, the user is required to create an account with the following restrictions; password using the standard restriction policy: minimum length, at least one lowercase and uppercase letters, at least one number and special characters as well as cannot be the same as the last two (2) passwords. (3.1.2.1.1.1.3)

- To browse the application, users are required to create an account with a real-time email which shall have both valid prefix and domain names.

3.4.   Non-Functional Requirements

3.4.1.   Database (*O: Hull*)

The application shall be built on MySQL Workbench as a MySQL database hosted on ODU's virtual machine with a Docker container. The database shall contain information about users, stores, products, rewards, and containers.

3.4.1.1.   User Account Information (*O: Hull*)

The database shall store the following information for users:

- User ID

- Last name

- First name

- Email

- Password

- Password hash algorithm

- If user is a store owner

- Date joined

- If user is active

- Zip code

The user is identified by a user ID.

3.4.1.2.   Store Information (*O: Hull, M: Maximova*)

The database shall store the following information for stores:

- Store ID

- Store name

- Store type ID

- Store status

- Owner ID

- Street number

- Street name

- City

- State

- Zip Code

- Country

- Website

- Email address

- Date joined

- Store rating

The store ID shall be the identifier for the store. Each store shall be

linked to a user account who is a store owner (3.4.1.1).

3.4.1.3.   Product Information (*O: Hull*)

The database shall store the following information about products:

- Product ID

- Product name

- Product specification

- Whether the product is organic

- Store ID

- Category ID

- Product type ID

- Unit price

- Unit

The Product ID shall be the identifier for the product. Each product

shall be linked to a store (3.4.1.2).

3.4.1.4.   Reward Point Conversion Information (*O: Hull*)

The database shall store the following information about rewards:

- Conversion ID

- Store ID

- Number of reward points

- Type of reward

- Description

- Quantity

- Unit

- Expiration Date

The Conversion ID shall be the identifier for the reward. Each

reward shall be linked to a store (3.4.1.2).

3.4.1.5.   Container Type Information (*O: Hull*)

The database shall store the following information about

containers:

- Container type ID

- Container type

- Materials

- Volume

- Unit

The Container Type ID shall be the identifier for the container.

3.4.1.6.   Database Conversion (*O: Maximova)*

The database shall deliver information that shall be converted from

javascript to a python based language.

3.4.2.   Security (*O: Hull, M1: Maximova*)

The application shall implement good cybersecurity practices to prevent

unauthorized access to user information. This shall be done by:

3.4.2.1.   Requiring a password of a certain length with special characters and an email address for a user to access their account.

3.4.2.2.   Encrypting passwords.

3.4.2.3.   Database encryption.

3.4.2.4.   Network and data security.

3.4.2.5.   Data validation and sanitization.

**3.4.3.   Availability** (*O: Chang-Horvath, M1: Hull*)

3.4.3.1.   Store search availability (*O: Chang-Horvath, M1: Hull*)

- Shoppers and store owners/employees shall be able to perform store searches 24 hours a day, 7 days a week.

- The prototype shall be able to complete at least 90% of its store searches without error.

3.4.3.2.   Product search availability (*O: Chang-Horvath, M1: Hull*)

- Shoppers and store owners/employees shall be able to perform product searches 24 hours a day, 7 days a week.

- The prototype shall be able to complete at least 90% of its product searches without error.

3.4.3.3.   Product addition availability (*O: Chang-Horvath, M1: Hull*)

- Store owners/employees shall be able to add products 24 hours a day, 7 days a week.

- Store owners/employees shall not experience any delays, difficulties, or restrictions when adding products.

**3.4.4.**   **Reliability** (*O: Chang-Horvath, M1: Hull*)

- The prototype shall have a 90% reliability so that store searches and product searches return accurate information.

- The prototype shall have a 90% reliability so that shoppers and store owners may use Refill.Me's key features without interruption.

Appendix A: Site Maps *(O: Hull, M: Chang-Horvath)*

Site Map - Shopper
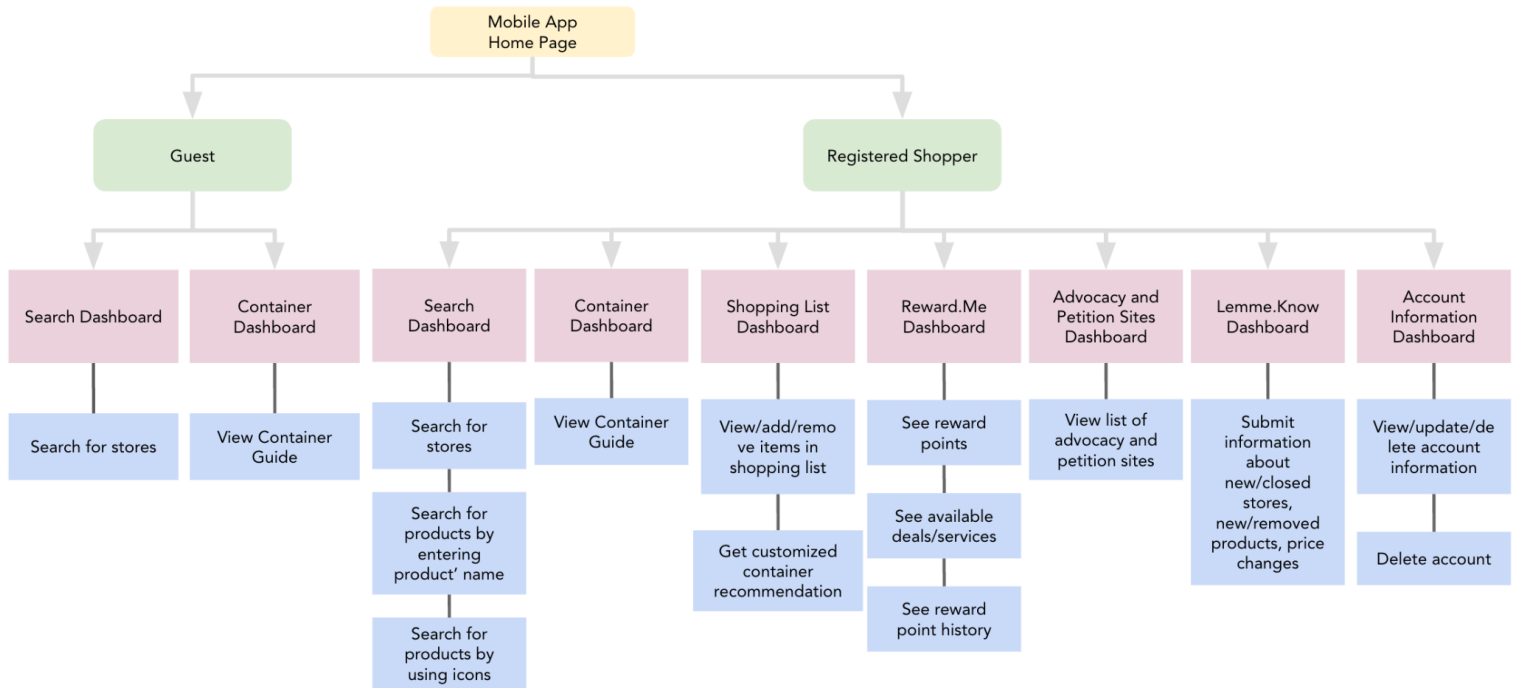
Site Map - Store Owner
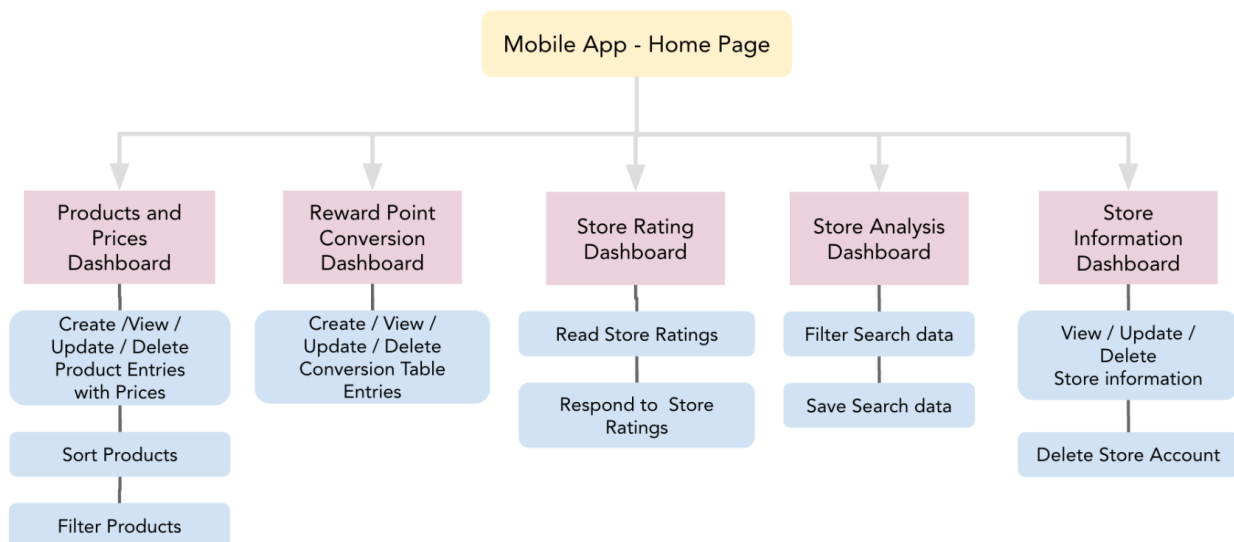
Appendix B: Database Schema (*O: Hull*)