

## **Lab 1 – Collaborative Outline**

Refill.Me - Team Iron

*Judit Chang, Michael Colombini, Katelynn Hull, Kira Maximova,*

*Abdullah Pathan, Gavin Rios, John Wasikye*

Old Dominion University

CS410 - Fall 2022

Professor Sarah Hosni

### **1. Introduction**

#### **1.1. Problem Background**

##### **1.1.1. Packaging waste problem**

##### **1.1.1.1. Environmental problems with plastic, paper, aluminum, and glass packaging**

###### **1.1.1.1.1. Greenhouse gas emissions**

###### **1.1.1.1.2. Microplastics pollution**

###### **1.1.1.1.3. Usage of nonrenewable resources**

###### **1.1.1.1.4. Plastic and glass do not biodegrade**

###### **1.1.1.1.5. Paper can be recycled max. seven times**

###### **1.1.1.1.6. Leakage of harmful chemicals from plastic packaging into food**

##### **1.1.2. Recycling**

###### **1.1.2.1. Low recycling rates**

##### **1.1.3. The Emerging Market of Reusable, Compostable, Edible Goods**

- 1.1.3.1. Regulations that shape this market
  - 1.1.4. Package-free shopping
    - 1.1.4.1. BYOC
- 1.2. Problem Description
  - 1.2.1. Packaging waste from mainstream grocery shopping damages the ecosystem
  - 1.2.2. Lack of information regarding package-free options
  - 1.2.3. Struggling shoppers
    - 1.2.3.1. Main motivation
    - 1.2.3.2. Practical obstacles
  - 1.2.4. Missing information hub
- 1.3. Solution Description
  - 1.3.1. Refill.Me helps to significantly reduce packaging waste by supporting package-free shopping
  - 1.3.2. Plenty of Information
  - 1.3.3. Helping shoppers do package-free shopping
  - 1.3.4. Encompassing information hub

## **2. Product Description**

- 2.1. Overview
  - 2.1.1. Mobile application optimized for mobile phones for the shoppers
  - 2.1.2. Mobile application optimized for tablets for store owners
  - 2.1.3. Goals
    - 2.1.3.1. Connect package-free shoppers with package-free stores

2.1.3.2. Help people who are interested in package-free shopping

2.1.3.2.1. Help novice package-free shoppers to transition into package-free shopping

2.1.3.2.2. Help experienced package-free shoppers to maintain their shopping habits

2.1.3.3. Support local businesses

2.1.3.4. Reduce packaging waste

2.1.4. Objectives

2.1.4.1. Create an app that provides practical information regarding package-free shopping

2.1.4.2. Provide a useful platform to both shoppers and store owners

2.1.4.3. Collect data to help store owners optimize their offerings

2.1.4.4. Keep shoppers engaged and motivated

2.1.4.4.1. Reward.Me feature

2.1.4.4.2. Provide store rating

2.1.4.4.3. Provide feedback regarding the app

2.2. Key Product Features and Capabilities

2.2.1. Main features for shoppers

2.2.1.1. Store search

2.2.1.2. Product search

2.2.1.2.1. Search by icon

2.2.1.2.2. Scan barcode

2.2.1.2.3. Enter product's name

- 2.2.1.3. Container Guide
- 2.2.1.4. Container Recommendation
- 2.2.1.5. Shopping List
- 2.2.1.6. Reward.Me
- 2.2.2. Main features for store owners
  - 2.2.2.1. Product and Price dashboard
  - 2.2.2.2. Reward Point Conversion
  - 2.2.2.3. Coupon dashboard
  - 2.2.2.4. Store rating
  - 2.2.2.5. Store analytics
  - 2.2.2.6. Store search
  - 2.2.2.7. Product search
    - 2.2.2.7.1. Search by icon
    - 2.2.2.7.2. Scan barcode
    - 2.2.2.7.3. Enter product's name
- 2.3. Major Components (Hardware/Software)
  - 2.3.1. Three-tier architecture
    - 2.3.1.1. Hardware
      - 2.3.1.1.1. For shoppers: mobile phone
      - 2.3.1.1.2. For store owners: tablet
    - 2.3.1.2. Application layer
      - 2.3.1.2.1. Web server
      - 2.3.1.2.2. Integration of various APIs

- 2.3.1.2.3. Linking APIs with database
- 2.3.1.2.4. Algorithms
- 2.3.1.3. Data layer
  - 2.3.1.3.1. Relational tables for storing store, product, and user information
  - 2.3.1.3.2. Relational tables for data analytics
- 2.3.2. Software
  - 2.3.2.1. Languages
    - 2.3.2.1.1. Web Programming: HTML, CSS, Javascript
    - 2.3.2.1.2. Database Programming: MySQL
  - 2.3.2.2. Libraries
    - 2.2.2.2.1 Testing Library: JUnit Framework, XCTest
  - 2.3.2.3. Third-party Software
    - 2.3.2.3.1. Database: Amazon RDS for MySQL
    - 2.3.2.3.2. IDE: Visual Studio Code
    - 2.3.2.3.3. Code Repository & Version Control: GitLab
    - 2.3.2.3.4. Project Management: Trello
    - 2.3.2.3.5. Continuous Integration: Gitlab CI/CD
    - 2.3.2.3.6. Group Collaboration: Discord, Zoom

### **3. Identification of Case Study**

- 3.1. Who is Refill.Me for?
  - 3.1.1. Eco-conscious shoppers
    - 3.1.1.1. Mostly women

- 3.1.1.2. From Gen Z to Baby Boomers
- 3.1.1.3. Mainly reside on East and West coast
- 3.1.1.4. Diverse income levels
- 3.1.1.5. Highly educated
- 3.1.1.6. Passionate about environmental change
- 3.1.2. Stores selling loose products
  - 3.1.2.1. Supermarkets with bulk sections
  - 3.1.2.2. Package-free stores
  - 3.1.2.3. Farmers' markets
- 3.2. What will ReFill.Me be used for?
  - 3.2.1. Shoppers
    - 3.2.1.1. Search for information regarding package-free shopping
      - 3.2.1.1.1. Store information
      - 3.2.1.1.2. Product information
      - 3.2.1.1.3. Container information
    - 3.2.1.2. Create shopping list
    - 3.2.1.3. Collect and redeem reward points
  - 3.2.2. Store owners
    - 3.2.2.1. Communicate products and prices to shoppers
    - 3.2.2.2. Increase digital presence
    - 3.2.2.3. Get search information in their area
- 3.3. Who might use Refill.Me in the future?
  - 3.3.1. Grocery shopping apps

3.3.2. Trucks selling package-free products on the go

#### **4. Refill.Me Prototype Description**

4.1. Prototype Architecture (Hardware/Software)

4.1.1. Hardware

4.1.2. Software

4.2. Prototype Features and Capabilities

4.3. Prototype Development Challenges

## 5. Glossary

**Biodegrade:** to decompose and become incorporated back into the environment

**Bulk section:** an aisle where products are available in dispensers or bins, and the shoppers can buy the exact amount they desire

**BYOC (Bring Your Own Container):** an initiative to encourage shoppers to bring their own containers with them to the store in order to avoid creating packaging waste

**Compostable:** breaks down into organic matter and does not produce any chemicals during that process

**Container:** tote bags, produce bags, glass or plastic jars, glass or plastic boxes, glass or plastic bottles that can be used for package-free shopping

**Container Guide:** a small lexicon providing an overview of different types of containers and the types of products that could be stored in them

**Container Recommendation Feature:** a feature of Refill.Me that suggests specific containers for products based on the type of product such as liquid or solid.

**Experienced package-free shopper:** a shopper who has experience, and thus, knowledge of package-free shopping

**Farmers' market:** a market where local farmers sell their products directly to consumers.

**Greenhouse gas emissions:** gasses that trap heat in the earth's atmosphere such as carbon dioxide and methane, and thus directly contributing to climate change, predominantly emitted through human activities

**Loose product:** product sold without any packaging



**Mainstream grocery shopping:** grocery shopping that does not follow sustainable practices, thus, it entails buying packaged items, using plastic, not considering environmental aspects

**Microplastics:** tiny plastic particles that are less than five millimeters long and are created when larger plastic pieces break down

**Novice package-free shopper:** a shopper who has no experience, and thus, no knowledge of package-free shopping

**Package-free:** without any packaging materials such as plastic, paper, cardboard, aluminum, or glass

**Package-free store** (in the context of our application): supermarkets with a bulk section, stores exclusively selling loose products, and vendors at farmers' markets.

**Package-free shopper:** a shopper who prefers to buy loose products by filling them into their own containers

**Package-free shopping:** shopping using one's own containers, thus, shopping without creating packaging waste

**Packaging:** material used to protect a product from any damage during transportation

**Produce bag:** a reusable bag usually with a window and tare weight label that is used for buying fruits / vegetables

**Single-use:** designed to be used only once, and then to be discarded

**Tare weight:** the weight of an empty container that should not be included when the price of the product is calculated

**Tote bag:** a large bag, often made of cotton, used to carry many items

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