

Socially Responsible Computing - Computer Aided Farming

Team Name: Ctrl-Alt-Defeat

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March 10, 2024

Table of Contents

Title	Page
Executive Summary	2
Project Background	3
Solution	4
Deliverables and Goals.....	5-6
Required Sources	7-8
Conclusion	9

Executive Summary

“Community Partners 4 Innovation” is a dedicated non-profit organization based in Pomona, with a noble mission to nourish and uplift the local community. A significant part of this initiative is the Lopez Urban Farm, which plays a pivotal role in promoting sustainability, resilience, and eco-education.

Despite its impactful initiative, the farm grapples with the challenge of effectively managing its inventory, clientele, and donation income. During our interview with the farm’s owner, it became evident that the establishment lacks a robust system for maintaining concrete records pertaining to the availability of products, client list, and weekly donation amounts.

To address these gaps, we propose a comprehensive system that leverages various data structures, including dictionaries and lists. The implementation of a digital inventory system, a detailed clientele list, and a systematic donation tracking mechanism will not only streamline the farm’s operations but also embody the principles of socially responsible computing. This approach acknowledges the far-reaching implications of our work on the broader community.

The opportunity to enhance the operational efficiency at Lopez Urban Farm and contribute to their commendable efforts presents a unique intersection of technology and community service. We believe that the successful implementation of our proposed program will leave a lasting positive imprint on the farm and the communities it serves, reinforcing the farm’s role as a vital resource and strengthening its commitment to the community.

Project Background

Lopez Urban Farm, a large-scale initiative nestled in Pomona, California, operates in a synergistic collaboration with the Pomona Unified School District and other entities, including Cal Poly Pomona. Situated adjacent to Lopez Elementary School, the farm serves as a beacon of hope in addressing food security issues through its accessible “take what you need, pay what you can” model. In addition to cultivating a variety of fresh produce, the farm leverages its close ties with Pomona Unified to provide invaluable eco-education opportunities for students, fostering a new generation of environmentally conscious citizens. As a cornerstone of the community, the farm’s role extends beyond agriculture; it is a hub for learning, sharing, and growing together.

However, the farm currently faces challenges in maintaining its bookkeeping, particularly in tracking inventory, donation income, and clientele. The availability of produce is loosely recorded on a whiteboard, and the flow of clients is not adequately documented. This lack of structured record-keeping makes it difficult to understand the specific needs of each client and how the farm can optimally meet those needs while sustaining its operations through donations.

We aim to address this issue by enhancing the farm’s bookkeeping practices. By implementing a more systematic and efficient method of tracking inventory and donations, we hope to better understand their clients’ needs, improve the farm’s operations, and ensure its continued success as a vital resource for the community.

Solution

We aim to implement a client-inventory system to adhere to the needs of the consumer and the wide variety of produce that Lopez Urban Farm provides. A user-friendly platform will be developed to allow the consumer to view the produce at the farm: kale, beets, fennel, arugula, swiss chard, broccoli, dill, cilantro, collard greens, bok choy, mizuna, green onions, mustard greens, lettuce, black berries, joy choi, eggplants, hot peppers, carrots, and cauliflower.

The user can observe attributes regarding product availability, whether the products are in season, and the farming practices used to cultivate them. In order to effectuate the “take what you need, pay what you can” objective, a recommended price for each item is also available. The user is able to input the types of products they want, the specific quantities of each desired product, and how much they are able to pay. Our solution also involves a feature that handles product subscriptions, allowing users to place bi-weekly and monthly orders automatically.

As the current product distribution system at the farm is solely in-person, the user can input when they will be visiting the physical location to pick up their produce. Future implementation of the solution involves curating a program in which the products can be directly purchased online, allowing the processing/shipping of the produce to ensue in accordance with the farm’s implemented practices.

Deliverables and Goals

To efficiently manage the farm's clientele and their service requirements, we propose the use of a dictionary data structure. This will allow for quick client lookups, with the client's name as the key and their required services as the value.

We will create a Client Object that encapsulates the name of the client and other personal details such as address or contact information. An "isActive" field will be used to keep track of whether or not the client currently has an active service required.

The farm's existing inventory system, which relies on physical records and manual updates on a whiteboard, requires much of an overhaul. We will use a list data type to keep track of inventory, allowing for easy adding and removal of entries. As clients require services linked to the inventory, a tree or graph will be employed to track this relationship.

The inventory object will incorporate the produce, the produce type, and its availability. Utilizing Java's capabilities, we can use the current date to automatically categorize items as "in" or "out" of season and determine product demand based on past data.

The interface for the farmer will be through the terminal input and output. We will present a list of options and have the farmer input numerical or alphabetical keypresses correspondingly. For the clients, input will be through a JOption panel for a more user-friendly experience. This implementation can be presented to the farm's clients on a touchscreen device or as a semi-permanent kiosk near the entrance.

Various testing and validation processes will be implemented in order to ensure that the project deliverables are up to standard. By way of illustration, the JUnit 5 test framework will be integrated into the project. This will include conducting parameterized tests for various classes within our methods, such as checking invalid user input (negative amount of produce, negative donation amount, invalid product name, etc.). In order to accommodate capitalization differences in spelling, cases will be ignored when analyzing user input. Moreover, testing will be done to handle cases where the client requests a quantity of produce that exceeds the available amount, in addition to cases where the product lists are empty. Real-world test cases will also be implemented through the process of revisiting the farm, and asking the volunteers/workers that reside there to utilize a prototype of our program. Following the prototype testing, changes/accommodations will be made depending on flaws in the user-friendliness of our project.

Required Resources

1. Personnel

- a. Hasti Abbasi Kenarsari
 - i. Coordinate/conduct code reviews
 - ii. Create list for product inventory
 - iii. Generate Javadoc files
- b. Ryan Wei
 - i. Outline the project proposal
 - ii. Create dictionary for clients
- c. Medha Swarnachandrabalaji
 - i. Handle user input/output through terminal
- d. Kenzie Lam
 - i. Handle JUnit 5 test framework
- e. Alex Auyon
 - i. Handle user interface

2. Equipment and Tools

- a. GitHub
- b. Copilot
- c. IDE: Visual Studio Code
- d. Java Unit Test Framework: JUnit 5

3. Budget

Item	Cost
Gas (required to travel to/from farm)	\$14.59
Total	\$14.59

4. Risk Mitigation Strategies

- a. Conduct comprehensive research of the farm prior to scheduling a meeting with the owner. Ensure that all questions we aim to ask are identified, and the scope of our project can be addressed with the points we plan to bring up.
- b. Identify the bounds of the project scope. Ensure that we are equipped with the resources and skills to carry out the project in the given time frame.
- c. Maintain an open line of communication amongst all team members contributing to the project. Outline key responsibilities, ensuring that each team member plays an equal part. Keep track of the progress of members by conducting thorough code review sessions.

Conclusion

The Lopez Urban Farm serves a vital purpose in the community, not only providing easier access to food for everyone but also cultivating an environment of closeness and comradery. For those reasons, it is important to both preserve and assist the growth of the farm. Based on the circumstances that were observed when visiting, we feel that the best course of action would be to assist in making their services more accessible by simplifying the user experience as well as improving their bookkeeping. By categorizing the inventory of the farm more clearly and presenting it to the potential consumers, that point of interest will be addressed and their reach will be improved.