**Lopez Urban Farm Centralized Management System**

SRC Technical Report

<https://github.com/DeadlineChasingDevs/SRC-Project>

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1. **Introduction**

The Lopez Urban Farm is a community wellness project by the nonprofit organization Community Partners 4 Innovation in collaboration with the Pomona Unified School District. The farm aims to address food security issues while promoting sustainable farming practices with the help of local volunteers and any donations. Inspired by the civil rights advocate Ignacio Lopez, the farm’s goal is to “sow the seeds of a sustainable and just future.” The farm follows these principles by distributing fresh produce locally, educating the youth towards a sustainable tomorrow, as well as providing inclusive green areas for community bonding. This paper explores the proposal to implement an application for a centralized digital management system, highlighting the importance of efficient organization to support the farm’s aspiring objectives.

1. **Project Overview**

The Centralized Management System proposed for the Lopez Urban Farm was designed in response to observing possible organizational challenges under the farm’s current operations. It was noted that the manual process of paper and pencil was prevalent in everyday farm activities. This existing system exhibits various limitations such as susceptibility to errors and tedious time-consuming record-keeping. Staff members may easily find themselves overwhelmed or confused with looking across various papers when needing to organize farm activities. The transition into a digital management system could significantly enhance operational efficiency and streamline day-to-day farm operations.

The Centralized Management System aims to digitize the key farm management processes by including functionalities such as task and volunteer management, crop lifecycle tracking, inventory analysis, as well as their respective reports for a convenient farm overview. With this technology, it is hoped that farm staff will have the tools to facilitate better resource allocation, decision-making, and overall organization. By steering away from the manual paper and pencil methods, the Lopez Urban Farm’s endeavors to foster a culture of sustainability and inclusivity can be better accomplished.

1. **The Implementations**
   1. **Central Management Application**

The Central Management App serves as the foundation of the project proposal, providing a user interface that staff can use to interact with the various incorporated functionalities. As for the moment, the user interface is located within the terminal and input is taken via the command line and keyboard; however, the application provides clear visuals and instructions for users to understand. Since a database was not included in the implementation, data is not saved in between different uses. Thus, for demonstrative purposes, pre-written example data is generated at the beginning of each app start.

In terms of the code behind-the-scenes, CentralManagementApp.java makes use of four instances of other classes and uses their respective methods by asking the user for input, if applicable. Each instance represents a functionality, which each have a dedicated menu of options for the user to select from—there exists a menu for managing tasks and volunteers, crops, inventory, as well as generating reports.

* 1. **Task and Volunteer Management**

The Task and Volunteer Management is the portion of the application that focuses on coordinating tasks of the day by assigning them to the next available person. The user is able to add new tasks or volunteers, assign volunteers to tasks, and provide feedback or ratings to volunteers. The ability for users to easily view online the different tasks and availability of volunteers or staff in one location helps with productivity and efficiency in planning the farm’s schedule.

TaskScheduler.java manages these aspects of the application. Tasks are kept tracked via a List data structure, with tasks ordered by a priority number assigned by the user—the lowest number implies highest priority. Each task is assigned a number of volunteers needed as well as a List of resources required for that task. Volunteers are maintained in a Queue data structure, where the volunteer at the front of the queue is the first to be assigned to a task. Each volunteer has their own List of assigned tasks along with personal ratings and feedback that may have been given by a user.

* 1. **Crop Management**

The Crop Management portion of the application is responsible for keeping track of the lifecycles of crops based on the input of the user. Specifically, crops are assigned a date for planting and a date for harvesting, all while considering the estimated time for expiration. Within CropManager.java, the farm’s crops are stored in a List data structure, where crops can be easily added, removed, and retrieved. By digitizing a system to keep track of the farm’s diverse crops, it is much easier for staff to manage crops across the different harvesting seasons that come in a year.

* 1. **Inventory Analytics and Management**

Keeping track of inventory is an important task for any business, thus the Inventory Analytics and Management portion of this centralized system can enhance convenience for farm staff. Within the application, users can add, remove, and sell products that are in stock. Additionally, financial aspects such as revenue, expenses, and turnover rates can be viewed. The products included in the inventory are added by the user and include information such as product quantity, amount sold, money invested into the product, sell price, and expiration.

To track the products in the inventory, InventoryAnalytics.java makes use of a List data structure, in which products can easily be stored in the order in which they are added. This system also calculates the farm’s profit or loss as well as the turnover rate and value of the inventory, allowing more time for farm staff to manage the farm rather than tediously calculating these values for a large inventory.

* 1. **Report Generator**

The Report Generator portion of the application is where an overview of different aspects of the farm can be seen. The user has the option to view a report based on crop growth, task completion, volunteer ratings, and task assignments. ReportGenerator.java uses the methods included in the other portions of the application to provide this convenient overview. To be able to view all these generated digital reports in a single location eliminates the excess time spent on viewing the same information in different locations of the application, or referring to the initial paper-pencil issue, of different pieces of paper.

1. **Scalability and Improvement**

Considering the potential growth that may be seen with the Lopez Urban Farm’s initiatives to have a sustainable and inclusive future, scalability is essential, and the Central Management System demonstrates this in several ways. The use of a dynamic data structure such as the List allows the system to handle a growing amount of data. Moreover, the user interface is intended to be able to remain intuitive and user-friendly, even as the amount of data grows. A noticeable feature of the application is that different functionalities are segmented apart, which can also ease the addition of new features or enhancements.

Despite these existing aspects of scalability, there are areas where further optimization can be taken. Firstly, this system relies on in-memory data storage, which is not optimal for the large dataset a farm will have. Integrating a database management system will enhance scalability by providing an efficient method in storing and retrieving data. Additionally, the current application lacks robust error handling, thus implementing additional security features could solve troubleshooting and any invalid inputs into important data fields. It is beneficial to work closely with those managing the farm for the application to align with the needs and preferences of staff as well as being able to proactively plan for future scalability as consumer needs and demands evolve.

1. **Impact of Computing**

A concept such as the Centralized Management System can play a beneficial role in promoting sustainable farming practices by optimizing resources, minimizing waste, and enhancing overall productivity. If farm staff can make informed decisions at a more efficient pace, more time can be dedicated in other aspects of the farm. In general, computing technologies being incorporated into farm operations provides tools that minimize errors, optimize time, and help provide faster data-driven insights. Tasks, that were otherwise manual, could be automated, and data, that may not be digitized, could now be shared online.

1. **Conclusion**

The implementation of a Centralized Management System for the Lopez Urban Farm could be the step towards enhancing efficiency and sustainability. By digitizing and centralizing key farm operations, farm staff can make data-driven decisions and optimize resources in a much more productive manner. In order for the farm to advance in their initiative to form a just future, an investment in technological solutions is crucial.