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Team Name: Coded Different

## 1. Executive summary:

In our modern era, technology has become a useful tool to aid many jobs, and agriculture has much to benefit, including the possibility of increasing productivity and sustainability in farming practices. Henceforth, our project aims to capitalize on computer assisted farming using a calendar application to digitize gardening, which would appeal to gardening enthusiasts, with an emphasis on helping the Lopez Urban Farm in improving these farming practices.

Our product will include a user-friendly calendar interface that will be easy to approach, including a method to monitor daily tasks. This will include watering rotations, fertilizer schedules, weed management, etc, which will be organized using a database that takes into account the management factors of the plant that is being grown (each plant and its details will be manually inputted). The calendar will make sure not to compromise on any factors related to the management of plant care, while not overcomplicating anything for the users of our program. Extensive planning with the help of SMART (Specific, Measurable, Achievable, Relevant, Time-bound) goals will ensure that our product is not only serviceable, but polished to make the program as smooth of an experience as possible. By maintaining contact with the Lopez Urban Farm during development, the final product will be accommodating and relevant to the purposes of this farm.

Our project aims to use computer science in order to optimize management of plant care as well as provide a way for new farmers to learn how to grow crops. By providing a method to monitor daily tasks, our product will revolutionize the way that farmers plan activities and optimize agricultural techniques. Ultimately, the end goal of the product is to provide an

organized way to approach farming with as few cons as possible, while hopefully inspiring new volunteers of the Lopez Urban Farm to learn and assist the community by nurturing plants of their own.

## 2. Background

In today's world of agriculture, one key aspect is the implementation of modern technology to enhance the productivity and sustainability of farmers. As we step into the digital age, multiple aspects of society have grown to increase efficacy and effectiveness. Recognizing the importance of leveraging technology in the agricultural business, the implementation of a smart calendar that uses the power of computer science to allow farmers to seamlessly integrate a tool into their gardening routines is not just a progression but a necessity. In an era where precision farming and data-driven decision-making are becoming cornerstones of successful agriculture, having a productive calendar system can prove to be very beneficial for farmers to increase their overall measurement of economic performance derived from the amount of inputs and outputs they handle per day.

Through the implementation of a smart calendar farmers can integrate a myriad of routine tasks from daily watering to pesticide application enabling them to have a centralized platform to manage all activities, while also saving time and reducing the rate of oversight, which in all increases the farm efficiency. Additionally the smart cleaner can also aid through the incorporation of data-driven insights, as by having a clear overview of their tasks, farmers can gain insights into optimal resource arrangement, to ensure that there is no overuse or underutilization of resources such as water, pesticides, and seeds. These insights can allow a more sustainable approach to farming, ensuring that resources are used only when required.

Finally through the implementation of a smart calendar, the accuracy and efficiency of crop yields is drastically improved. Farmers can enhance the growth and development of their plants by tracking its daily progress, which allows for timely interventions to allow for proper adjustments to conditions that are unsatisfactorily, such as extremely sunny or rainy days.

### 3. Project vision & success criteria:

Our general goal with this project is to provide the Lopez Urban Farm with a calendar tool to help them with efficiency and sustainability. Our finished product will provide a multitude of features to help organize a schedule for the farm. The calendar itself will include crop specific management and scheduling as well as day by day task planning and the ability to set up routines. The application as a whole will also advise the user with information on how to manage crop growth in case they aren't already familiar with it. This feature is tailored for those who less familiar with agriculture, as the Lopez Urban Farm aims to educate youth on sustainable farming. It commonly holds events where children are encouraged to learn how to properly take care of crops, as well as the importance of sustainable farming.

It is because of this that we aim to make our software broadly usable, and not limited to use by the Lopez Urban Farm. While we are making it tailor made for them, our ideal finished product would be plug and play for anyone looking to try farming on a small or medium scale. This brings us to our goal as a company, which is to make farming more accessible for anyone looking to try it. We want to create software that aims to both aid the user in their pursuits while also being informative for the people who are new to farming. Our project will be successful if someone new to farming can intuitively pick it up and it can help them learn and successfully grow crops.

## 4. Potential risks and mitigation strategies:

While the implementation of a smart calendar in agriculture holds great promise, there are potential risks and challenges that need to be acknowledged to ensure the success and sustainability of the smart calendar system.

- a. Weather:
  - i. The smart calendar cannot take into consideration weather and unpredictable weather patterns which can impact crop yields and growth.
- b. Unique Growth Patterns:
  - i. Some crops may exhibit unique growth patterns based on factors such as soil composition which cannot be taken into consideration by the smart calendar.
- c. Unknown Factors:
  - i. Factors such as unexpected pest infestations and diseases may emerge without warning, eluding the smart calendar's predictive capabilities and potentially leading to adverse consequences for crops.

## 5. Project scope & deliverables:

Our work mostly involves coding a UI for the calendar and coding a backend system for all the data that will need to be input into the calendar app. For the first part, which is the calendar ui, we plan on using JavaFX to create an aesthetically pleasing, simple UI that conveys all the information we want to convey. This UI will be linked to a backend also written in java. The program will organize both user inputted and external data into various storage formats. The usage of a database may or may not be necessary depending on how much storage the program demands and whether or not persistent data storage is required. In this case, we will be

implementing several libraries beyond JavaFX, primarily to connect to and read and write from the database.

Our work will be done mostly remotely. Our 5 group members will be adding code to the shared github repository as the semester progresses, and we will split tasks based on the skillsets and knowledge of each group member. The deliverables we want to guarantee the completion of are the calendar UI and the backend data system. The features we want to guarantee are the overlying calendar functionality, a simple calendar UI, and the plant adding/removing system. We would also like to include the crop caretaking information and a more sophisticated UI if we have the time and resources to do so.

## 6. SMART goals

For this project, we have created a set of SMART goals that will help us in creating our smart calendar. One of these goals is to communicate with the Lopez Urban Farm whenever necessary. This can include asking for clarification on a specific problem or learning new information that will help us. Another goal of ours is to properly chunk and set deadlines for us to meet in order to ensure a smooth and easy workflow within our group. Overall, our goal is to create a smart calendar that will centralize the daily activities of the farm in order to streamline the workflow of the farm

## 7. Expected benefits:

The farm's employees can be alerted digitally through an automatic notification on their mobile phones when a task needs to be completed. New tasks can easily be inputted by management when something new that needs to be completed arises and employees will be

alerted as soon as it goes in. With this, communication will be as efficient as can be and there will be little to no confusion in terms of understanding the task at hand.

## 8. Project resource requirements:

For hardware: We would need computers to access the database and the program in-house.

For software: we would need some sort of database manager in order to oversee the calendar and testing software in order to test how the program would apply to the farm itself.

## 9. Project costs & budget:

To create the software itself, we will solely utilize open-source tools and libraries. Simply put, this will not cost anything. However, training employees to familiarize them with the software may cut into their work, which can ultimately cost the farm by hiring more employees or the down time needed to train them. The plan however, is to make sure that the UI is as user-friendly as possible to downplay this cost.

## 10. Project timeline:

The following is the predicted schedule and deadlines to help stay on track with the project:

1. March 17: Create a complete outline and blueprint, detailing all information and product requirements.
2. March 24: Establish some form of communication with the farm, do research into agriculture and how to create a calendar, select development tools, and plan the UI using pseudocode or some other basic form of documentation.

3. March 31: Using the documentation, create a skeletal model of the calendar application using JavaFX.
4. April 7: Design a backend for the product, implementing linear data structures to best fit the purposes of the product and integrate for the calendar's UI.
5. April 14: Design the database, including a way for the user to manipulate and store plant and task information. Integrate the database to the backend and complete a rough prototype.
6. April 21: Test, debug, modify, and clean up the product, ensuring that all parts are not only usable but also optimized.
7. April 28: Finalize remaining components of the project, including completing technical paper and project presentation slides. Make sure the entire project is properly pushed into GitHub and submit the final SRC.