# Project: Smart Garden Monitoring System

## 1.1 PROBLEM STATEMENT

Growing plants can be not only a time consuming task, but a very sensitive one as well. With our smart garden monitoring system, we hope to automate as much of the plant growing process as feasibly possible in order to make it more consistent and manageable for the user. Doing so will save time and money, and will in turn make growing plants a more accessible task for a wide range of potential users.

## 1.2 REQUIREMENTS & CONSTRAINTS

The Smart Garden Monitoring System (SGMS) requires many hardware components as well as a software to display the analyzed data to the user.

Functional:

* Monitor temperature of the environment in order assure plant health
* Time the growth of the plant
* Water the plant using a timed water pump
* Give the plant light using an led plant light

Resource:

* Funds to purchase Seeds, & Soil
* A location to host our project
  + The allocated amount of space offered for this project may constrain the size of our prototype
* This project must be completed by the end of April 2021(constraint)
* Sensors and circuitry to observe the plant and communicate findings to the user

Economic/Market:

* This project must cost under $1000 to create and operate (constraint)

Environmental:

* A small greenhouse will be constructed to avoid temperature variations while testing the prototype

UI:

* The user should be able to see all signals charted clearly with an automatically analysis of the plant’s health and remaining time until maturity if starting from a seed

Other:

* Soil should be treated properly to reach a state of chemical balance and obtain maximum plant growth

## 1.3 ENGINEERING STANDARDS

Some common standards we may need to follow are IoT standards regarding security and communication protocols. These standards may also coincide with bluetooth standards which we could use for short distance wireless communication and wifi/ethernet standards which would be used for long distance communication. The short distance bluetooth may be useful for wireless probes or other tools/features, whereas the long distance communication may be useful for controlling the system with a cellphone or computer that is located in a different location.

## 1.4 INTENDED USERS AND USES

Due to not having a client, despite our best effort of trying to get one, the only real users

of this project at the current time will be us. That being said, the design of something like this would be very beneficial to be able to produce food in a small environment with a busy schedule. Our design has the potential to be used in the future to a food shelf or a family that needs it. All this includes that it will help the user grow healthy food which will: save on money, time, and lead to healthier available food options. They would use it to grow food for themselves or those who need it but do not have time or a green thumb to grow it themselves.

Beneficiaries from our project:

* On a smaller scale:
  + Hobby Gardeners
  + Educational tool
* On a larger scale:
  + Food insecure populations
  + Humanitarian efforts

Use case:

* Grow plants for hobby gardeners
* Work as an educational tool for students
* Grow healthy food for a family in need, shelter, or food shelf
* Present healthier food options to the user
* Help grow a space, plants, in which the user takes comfort in
* It should be able to be used to track and monitor the levels of water, light, temperature and growth time of the plant.
* Display crucial information on the application, and ability to adjust based on the information that is being given.
* If one goes into the application they can check the level of water, and light that the plant has been given for the past week
* They are able to track, write down on the application if they can see new growth on the plant to track if the light and water levels are working