Individual Capstone Assessment

Kevin Eaton

If this semester has taught me that if anyone is as busy as I am right now, taking care of a plant is the last thing on some people's mind. I personally have killed too many plants from forgetting to water them or not giving the proper amount of sunlight. Our senior design group project focuses on developing an Android app, a database, and hardware to monitor water levels and light levels for a potted plant. These water and light levels will be sent to the app through the database for the user to monitor to see if their plants need any more water or sunlight and aid plant owners in their day to day lives. This project is about learning how to integrate hardware and software to make one solution using all the tools I have learned from my four years of school and co-op experiences. This project will be a great learning experience for myself and our group (and hopefully will be useful to me and my previous plant-killing ways).

Many of my college experiences will help guide us in this project's development. A lot of the classes I have taken over the past four years and currently are building blocks to my current knowledge base. Some specific classes that will help are:

CS4092 *Database Design/Development*:

The database design and development course was helpful to understand the basics of SQL and the base functions of how databases operate. This will be useful to us in designing our database to interact with the android application and the hardware components.

EECE 3093 *Software Engineering:*

The software engineering course was a good introduction on how to work together in a group and different strategies on how to collaborate on a software project. The tools that we learned about and the work we collaborated on during the class will be helpful in our senior design project.

CS 2021 *Python Programming:*

Along with any other programming course we took, python programming will be instrumental in making this project work. This course set the foundations of how python works and is important for use in our raspberry pi, which works nicely with the GPIO pins.

All other classes, such as data structures and algorithms, are also foundational in my understanding of how to write code effectively and efficiently. These do not necessarily contribute directly to this project's development but are fundamentally a part of the code.

In my co-op semesters, I learned a lot of technical but also soft skills that are applicable to this project. Specific examples of that are:

Ariel Corporation as a Mobile App Development Co-op:

As a mobile app developer, I learned a lot of technical skills related a lot to developing for Android and Apple. This will benefit this project with working in android to develop an app to communicate with our plant monitoring hardware. Along with technical skills, this co-op was great for soft skills. It was my first development job in a corporate environment and I learned how to collaborate well on software projects with others. This will help in our project with collaboration between my team members.

Booz-Allen Hamilton as a Computer Engineering Co-op:

In my co op at Booz Allen, I worked a lot with python and Linux as well as some hardware integration. This will be very helpful to integrate the hardware with the software as we plan on doing. A soft as well as technical skill I gained on this co op was collaboration through GitHub. I had never worked with others fully virtually before and shared code through GitHub and it poses both a technical and communication challenge to make sure no one erases others progress and that everyone is working on their part.

This project excites me a lot. Doing an IoT project has always been something I have wanted to fully complete and this is a great chance for me to try it out and do some fun work. I have had a raspberry pi for a while now and am just now getting around to use its full potential. I think IoT has plenty of applications in for almost everything and learning the challenges and methods of an IoT solution now will be great for the future. The preliminary approach for me when designing a solution is to start big and go small. Taking the big picture and slowly breaking it down into more and more detailed components, like a tree data structure, will eventually get to every small detail of the project. This is my tactic to approach almost every problem and allows for an organized and efficient way to understand the problems and what is needed for the solutions. The expected results are an app that effectively can read data from the raspberry pi sensors from the database. The app should also be able to tell you if there needs to be more water or more average sunlight for the plant to be grown effectively. For a stretch goal, adding either photo recognition of a plant to let you know if it has the proper water and sunlight based on the species or automatic watering would be interesting to do. For myself, I will self-evaluate my contributions based on if the hardware part works well. This is because I have made it my responsibility to make the hardware work with our other components (app, database). If my part of the project is solid and complete, I will feel as though my contribution was good and I am done.