

Individual Journal (9/12)

Team: The Raiders

Class this week was centered around proposing projects. Our group's project idea was around an electronic board that could help replace chalkboard/whiteboards. In preparation for a project like this, I began researching into already existing smart boards and the software they use in connection to my computer science background.

In that research, I saw that smart boards are limited to needing projectors to used alongside with the board as well as the software used for smart boards is proprietary so there would not be open-source software to reference. Our proposal in class also provided some issues that need to be addressed.

Some of the issues mentioned was that some classes prefer older white/chalk boards rather than an electronic board. Another concern is that broadcasting the board's contents could already be done by screensharing through a Zoom call. Along with that issue, the bandwidth needed to broadcast to multiple devices in a single classroom with an unstable university internet connection would cause issues.

After compiling the concerns from the class and instructor, we decided that we had to revise our initial project idea. To accomplish this, we discussed with the instructor about looking into one of the remaining pre-existing projects as we had all discussed interest into a LoRaWan project. So, we reached out to Coach Clayton about it and are having a meeting with him and the instructor about setting up a LoRaWan project.

### Individual Journal (9/26)

Class last week was about the practice skills assessment. The assessment seemed relatively painless but most in the group are worried about how different the final assessment will be. I did relatively well on the practice (~89%) so I will just make sure to review the sections of the questions I got wrong to help prepare.

Class this week was centered around the project planning paper but ended up having a heavy focus on the results of the practice assessment and how the average scores were much lower than anticipated. The class average didn't really affect me as the bigger issues centered around EE/CE, but CS students still struggled on average. To help I plan to offer help to students in and out of my group to the best of my abilities.

For the project planning paper, our group noticed that it required multiple sections to fill out. In order to complete the assignment, we split up the assignment into parts between hardware and software. For the software side, we had to look into the different models of software development to find which would work best for our group. Looking at our group, we have 3 EE and 2 CS students, so we had to look for models that work well in small groups. In addition, we had to take into consideration that the software in the project will not need to be overly complex, so we looked for simpler model to best fit the project. Taking those factors into consideration, we decided on using the waterfall model as it fit the criteria we were looking for.

Since our project will be connected to LoRaWan, our group also made sure to head over to go create to tour the building as well as register to get a badge in order to be able to use it for project development in the future.

### Individual Journal (10/17)

Class during the last 2 weeks was centered around the midterm presentation for the requirements review. Our group was a little nervous about the presentation especially after the issues over deciding on a project when we last had a presentation in class. We saw that each group had a 20-minute time limit, so we split up the workload in order to keep the workload from becoming heavily one-sided.

Class this week was all about the graded skill assessment. There was still a lot of confusion leading up to assessment as to what the question format would look like. Some students had assumed that the practice skill assessment would somewhat mirror what the graded assessment would look like. Eventually we did get some clarification for how the questions will be formatted but overall, the graded assessment was quite different from what the others had assumed.

Personally, I had used the questions from the practice assessment to study along with preparing a formula sheet with the common time complexities of the popular data structures and sorting algorithms. Using this formula sheet, I also refreshed on the possible topics that could appear on the assessment. Just as I had assumed, the multiple-choice section of the graded assessment was quite simple as well as the short answer questions. The only challenging multiple choice question was based around a doubly linked list. I eventually reached an answer once I drew out the diagram and went step by step in the program. I didn't really end up using the formula sheet there wasn't much overlap between the practice and graded assessment.

For the midterm presentation, we split up the sections so that each person in the group could present for around 4 minutes. I researched into the software integration of the project as well as the foundations of LoRaWAN as a whole. Using a diagram of LoRaWAN, I split topics into 3 categories, device to gateway, gateway to network, and network to application. For device to gateway and gateway to network, I researched into ChirpStack for a reliable and popular integration and the differences between ABP and OTAA device profiles. For the network to application connection, I looked into the API ChirpStack provides that can work with existing applications or with new applications made for the device.

### Individual Journal (10/31)

Class last week was centered around building the technical specifications paper. To do this, the 3 Electrical Engineers in our group needed to write the specifications of each part we are using in our project as along with any restrictions or limitations they possess. The 2 Computer Science majors, me and Julian, had to dig into the specifications of the software we will use and the restrictions and limitations they have especially with the most important piece called LoRaWAN.

Class this week was centered around creating block diagrams for our project. Since this is an individual assignment, each member of the group must create their own specific block diagram. So, the Electrical engineering students will write the block diagrams for the hardware integration while Julian and I will write the diagrams for the software integrations of the application server and LoRaWAN.

For the technical specifications paper, Julian and I worked together to research the software section of the paper. To complete the software section, Julian worked on the software alternatives while I worked on the software features along with their restrictions. The first big issue that we ran into was that one of our electrical engineer members got sick prior to the skill assessment and was not able to take the test on time. After that, he had gone silent for a while but eventually said that he would write up the hardware specifications. However, he went silent again after that along with the rest of the electrical engineers in our group not adding anything to the assignment by the deadline. At the deadline, Julian and I had completed the software section of the paper and none of the hardware had been worked on. Eventually after contacting the members assigned to the hardware section, they said that would complete the hardware section, but very little information was added to the assignment. So, Julian and I decided that we would have to work together to cover the hardware section in their place. We eventually completed the hardware section in around a day and submitted it late.

For the block diagrams, we asked the instructor about what was needed and eventually got some examples to use as reference. We split up the diagrams by hardware and software. Using the extra advice we got from the emails from the instructor, we were able to complete our block diagrams.

### Individual Journal (11/14)

Class last week was about conducting product interviews in order to get real feedback from people who have experience with the problem that the problem aims to solve or is educated in the product's implementation. For our group interviews, we interviewed a variety of people with a biomedical engineer student, former football players, and an engineer professor. The biomedical engineer was able to help clarify questions about concussions and how they can be detected. The former football players helped give us a first-person point of view of what a concussion is like and what impact data would be useful for the team to have for future reference. The engineering professor helped narrow the focus of the product's implementation and warned us of potential issues with our implementation along with how we should avoid them.

In addition to product interviews, our group also began testing using the software on the products' microcontroller by writing code to control the hardware. There was some initial worry as the computer would not recognize that the microcontroller was connected which caused some concern that there might be a hardware problem. However, after researching problems others had across the internet, I pinpointed the possibility that the USB cable plugged into the computer was only to charge the device. After replacing the USB cable with another, the computer was able to recognize the device and we began to write code to test the microcontroller's abilities.