Introduction Essay

Bret Leupen

At a high level, for our senior design project, we choose to create an app-controlled product. I think this is the best way for all the things I have learned in class and on co-op to come together in one project. There will be both software and hardware pieces to our project, which allows me to leverage everything I have learned so far as well working with new tech and concepts I will have to learn. In addition, we are hoping to partner with a local business. This will pair nicely, allowing for continued growth and exposure in the business world. In addition, I will continue working on my soft skills, gaining valuable teamwork, technical writing, collaboration and presenting skills. All in all, this project will encompass many of the skills I have acquired over my time in college and will display them in the form of a working prototype.

Over the first 4 years of my degree, I have gained a lot of valuable knowledge from my classes that will directly apply to my capstone project. From the start, I anticipate using my public speaking skills ("Effective Public Speaking" COMM1071) to help get a corporate sponsor. From there, we will have the task of laying the requirements for our project. I am currently taking Requirements Engineering (CS5127), which will help me specify and document all the requirements for our project. Once we start building and developing our project, my knowledge of finite state machines ("Intro to Comp Systems" CS2011) will come in quite handy. I have had multiple classes that have taught me proper code practices and techniques. Classes like Programming Languages (CS3003) and Software Engineering (EECE3093C) taught me valuable skills that will be useful in planning and developing our project. If necessary for our project, Database Design (CS4092) may come in handy for designing and implementing a database in our prototype.

On my 5 co-ops, I have acquired a wealth of valuable knowledge and skills. On my first co-op at *Siemens Software* as a software engineer, I learned about unit testing through test driven development. If we choose to include unit tests in our project, this will be very valuable to have knowledge of. I also learned requirements engineering and project management since I oversaw my own project to be implemented in NX. These skills will be valuable to our team's organization and should help us stay on track and deliver a product that the customer functions properly. During my time at *Atomic Robot,* I learned a lot about mobile app agile development. Since our project will likely be paired with a phone app, all my knowledge of mobile app dev should help us out. Finally, at *Chamberlain* as a Global Innovation Engineer, I was able to take a project from research + ideation to a working prototype. This will most likely be very similar structure of the project, and I have recent hands-on experience with this. I worked closely with a team as a firmware engineer, where I would design and code all the necessary firmware for our project. I also did a lot of CAD modeling and iteration to make sure our solution worked well. All these skills should be very useful in our senior capstone project.

I think there are many things that are exciting and motivating for me on this project. I am very excited to be working closely with a team. I often find programming and working with others to be more valuable and fun than working alone. Getting different viewpoints and perspectives is important for any project, so I am looking forward to everyone's creative ideas and solutions. In addition, I am very excited to hopefully create a hands-on prototype. I have worked doing a lot of intangible things, and I much prefer working on something physical with

immediate feedback. I love being able to create something from scratch and seeing my solution work as intended. I hope that our team can create and solve for our problem.

Our first steps are to get organized. We must first understand the project and get everything figured out before it makes sense to start coding and building. We are planning on finding a corporate sponsorship as soon as we can. From there, we can start honing in on what the requirements are for our project. While we have an initial idea, we want the customer's feedback to also help guide us. Once we understand the problem and the requirements for the solution, we can start laying out the project. We can pick a tech stack, hardware, and decide on how everything will connect and work together. But first, we need to start by clearly defining our goal and the requirements for our project. At the end of the year, we want to have a working prototype that works well in all aspects. The UX should be well laid out and intuitive. The hardware should function as intended. All code should work without bugs. Obviously, this will be a prototype and everything may not be fully flushed out, but hopefully we can get as close to these marks as possible.