A Reflective Journey: Navigating Your Cumulative Experience at Iowa State University

CprE 4940: Portfolio

September 26, 2025

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Throughout my education at Iowa State University (ISU), I have been prepared to face many different technical and non-technical engineering problems. For example, I have had various projects in which I had to collaborate with others. These projects often lead to better communication between team members and understanding the ethical requirements when working in a team. Not only do I need to put in equal work based on my designated responsibilities, but I have also learned to respect my team members' time and ideas. The ethics class made me realize that projects do not always have one best way of going about them. Whether I am making a technical decision or facing an ethical dilemma, there are many criteria to think about and communicate to a project's users and team. For example, I've encountered a technical issue where I needed to reduce power consumption by reducing performance. Furthermore, I've encountered ethical situations when the complexity required to be scaled down, which benefited the team, but lowered user usability.

While at ISU, I often sought more information outside of the classroom. Sometimes from curiosity, sometimes to reinforce in-class material, being able to find external resources is critical in developing my skills. Oftentimes, I found myself in office hours with the professor asking questions on class material and beyond. Forming study groups with classmates is a great way to practice homework questions and study for exams. When alone, finding reliable online resources is essential to maintaining integrity. Utilizing the school's access to databases like the IEEE to find papers is an excellent way of researching more on a specific topic. With AI increasing in power and popularity each day, it is also essential to find more information and confirm ideas rather than just copying from it. Non-technical resources like career services help develop areas outside technical understanding.

ISU has many opportunities available to students, and taking advantage of them can be beneficial. For example, each semester's career fairs provide a great way of getting job opportunities and improving communication with professionals. The ChipForge student organization has helped me learn more about the industry design flow than any class thus far, and it continues to allow me to apply the theoretical knowledge learned in class into a practical project. ChipForge specifically showed me how vast the computer architecture information is. It has shown me that there is much more to learn outside of the classroom. I also had the opportunity to be a research assistant and teaching assistant. Being a teaching assistant has provided me with a different point of view in the learning process and allowed me to strengthen how I present and explain information. As a research assistant, I have improved my ability to read technical papers. Research has shown me how much information is still waiting to be solved, and learning different ways other people have done stuff never ends.

When I became a TA, I had the skills required to do well in the class. However, this position required a new way of thinking about these concepts. I was not just learning these concepts anymore; I had to know them well enough to teach others. This changes both my technical and non-technical approach to learning, because I now think of how to learn concepts on a level good enough to recite them back and teach others. This approach "illuminated the path of continuous skill enhancement" by making me harness information differently, which improved how I spoke to others about information and how I memorize information.

Knowing what I know now, the first thing I would change about my time at ISU is joining organizations earlier. These organizations have helped me increase technical knowledge beyond what can be learned in class and have allowed me to meet new friends I can learn from. I would also try to get involved with research earlier, allowing me more time to get deep in a project and closer to professors before graduating. All of these provided me with much more great experience, and having this experience earlier would have benefited me more.

One topic I learned about recently for my research is hardware prefetching. This hardware component uses prediction to prefetch data into a processers cache, reducing the latency of the processor. When first presented with this topic, I did not know how this device worked theoretically or in physical implementation. The first step I took was to get a short list of the basics I should know from my professor. From this, he told me to start with simple prefetching types and learn about the crucial parameters that each prefetch provides. I then researched this using various online resources, like online lecture slides. With a base understanding, I then started diving into more complex prefetching implementations. I used the IEEE database to find research papers on different types of prefetchers and made a presentation explaining each. I would give these presentations to my professor and research team, where they would ask questions, and a deeper conversation would arise.

In one of my classes, the classroom lectures were often entirely theoretical. However, there was a project that implemented the hardware. From this, I used the theoretical workings of each component we learned from class and could design them as my partner and I wanted within functionality. This added a layer of creativity, designing different elements in different ways, matched with the fundamentals of trading power or complexity for performance. These various designs also allowed me to debug issues more easily and overcome obstacles we ran into.

My strategies to conquer engineering concepts start with notes. I make quick notes and get the point across, while including detailed and annotated diagrams. This strategy evolves primarily

through electrical engineering classes, where detailed circuit designs that I can look back on are very useful. Once I have the notes, I must drill those concepts into my head. This can be done by ensuring I am taking a lot of time on homework, doing practice problems, or designing a project to use these concepts.

Looking ahead, there is still so much information to take in. Each company uses different tools and strategies that I will need to continue to learn. And as technology evolves, I will continue adapting to new discoveries. I will continue advancing technology within the workplace, pushing for creative ideas and staying current on new research. While at ISU, I saw how important it is to share this knowledge. By sharing concepts with coworkers, engaging with students at career fairs or panels, and publishing papers, I will provide others with what I was provided and what I wish I had been provided.