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

My time as an undergraduate at Iowa State University has been challenging and rewarding. I have developed critical technical skills, a strong ability for teamwork, and effective communication techniques at ISU. This perspective focuses on the most important educational opportunities that have enabled me to continue studying design systems and engineering issues outside the classroom. Acquiring Engineering Skills and Problem-Solving Competencies

ISU has equipped me with a solid foundation in system design and the resolution of challenging engineering issues. Classes such as CPRE 381: Computer Organization and Assembly Level Programming and CPRE 487: Hardware Design for Machine Learning have pushed me to think critically and create holistic, real-world solutions. For instance, creating a custom processor in 381 required creating and connecting a memory unit, control unit, arithmetic logic unit, clock, and caches at different levels, in addition to other registers that helped to control the state. This is just one example from one class. I have had to create complex, complete solutions to difficult problems, weighing costs vs benefits for different solutions to land on the most optimal one.

Most of the ISU courses I took strongly emphasized cooperation and team learning, whether there was a large team project/lab or not. I understood the value of clear communication and task delegation, whether through peer collaboration on software development projects in classes like COMS 309: Software Development Practices or cooperative work in lab sessions like my computer networking lab in CPRE 489. During that network lab, I had a particularly memorable moment when we had to implement a fault-tolerant data transmission system. I was able to coordinate with other lab members, which meant that we had to communicate our findings, document our work in detail, and have solid discussions to improve our communication.

ISU helped me learn one of the most valuable things I have ever learned: the importance of seeking knowledge beyond the classroom. I frequently resorted to using outside sources such as academic journals, technical specs, and online professional forums to understand complex and high-level issues better. For example, when researching database management for my senior design project, I had to compare many potential solutions for database implementation. I focused my research on three main options: Firebase, MongoDB, and MySQL. I researched from professional sources far beyond the resources we initially provided for the project. Additionally, attending and participating in optional workshops and guest speakers exposed me to industry best practices, real-world implementations, and use cases for engineering principles.

Extracurricular activity and professional organization involvement have been key to my personal and professional development. Attending career fairs and networking events exposed me to industry experts and new technologies. Getting involved in student organizations helps instill within me the mindset of a lifelong learner through work on group, non-class related technical projects or through learning at skill-building workshops outside of my skill set. These experiences solidified my commitment to finding and meeting new challenges and overcoming them with innovative and creative approaches, all while learning and improving myself.

Throughout my undergraduate years, I have encountered numerous instances where I had to update my skills and knowledge with a new look at something. For example, while performing a networking experiment on CloudLab, I had to learn new network performance analysis tools quickly. Initially, I was skeptical and the efficacy of this new tool, but once I learned how to use it, it saved me tons of effort and time. Another example, when working on embedded systems for CPRE 288, my initial approach was to finish the entire project, and only then go through and test what I had created. This process caused nothing but headache after headache as my solution would be so buggy that, at times, it was faster to start from scratch. After struggling, I decided to segment my work and test it in parts as I developed. This saves me from numerous high-level, challenging-to-catch issues that I noticed almost immediately. If I hadn't been open to learning a new way of working, recommended by the insightful TA, I would have had a much harder time in the class. These instances reinforced the need for lifelong learning and adaptability in a rapidly changing field.

When looking back on my undergraduate experience, there are a few things I would have done differently. I would have sought more research opportunities and industry internships earlier in my academic life. I sold myself short as an underclassman, thinking I wouldn't be able to get anything. I didn't even bother applying, and this likely caused me several opportunities for growth and learning. I would have also invested more time working on my soft skills, such as public speaking and leadership, as these are just as important, if not more important, as technical expertise in whatever field you are working in. However, despite these areas of improvement, my experience at ISU has been invaluable in making me a well-rounded engineer to face real-world problems with real-world solutions.

My overall experience at Iowa State University has been vital in preparing me to confront the professional world. With demanding courses, group projects, external learning opportunities, and experiential learning, I have developed technical, analytical, and communication skills. All are gearing me toward professional success. This process

taught me the value of ongoing education and adaptability in an ever-changing world. There is no other way to ensure that I am adequately equipped to confront this evolving world of computer engineering.