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

As a Cyber Security Engineering (CYBE) student at Iowa State University (ISU), my journey has been marked by a wide range of technical learning, problem-solving, and personal development. ISU has provided a comprehensive environment that equips students with the skills to use industry-standard tools and coding languages, as well as the ability to work in teams, self-learn, and formulate new ideas from existing ones. Through various interactive labs, term projects, and group assignments, ISU has allowed me to be a self-starter and an independent learner for anything that may come my way. These foundational pillars will enable me to continue my education, either formally or informally, through on-the-job learning, allowing me to evolve professionally and continue expanding my knowledge for years to come.

Iowa State's learning journey begins in the classroom and extends into the labs, where concepts and ideas are introduced, but the actual learning is left to the student. This approach, combined with teaching the building blocks of all digital systems, advanced mathematics, sciences, and writing, enables students to become self-learners who can adapt to anything that comes their way. Iowa State initiates the Cyber Security Engineering journey by learning C through interactive, self-directed labs, where students are expected to practice and master skills outside of class to complete the course successfully.

This foundation then leads the student into Java courses, where advanced coding techniques are introduced, such as manually building linked lists, binary trees, or the logic behind simple games like Billiards, 2048, or a train route simulator. After completing these

courses, a CYBE student can expect to continue their education using command-line interfaces such as Linux, with multiple distributions like Red Hat or Kali. Students are tasked with building networks and participating in simulated Capture the Flag-like labs, where they play both red and blue team roles, utilizing common tools such as Splunk and password crackers. Eventually, they progress to cryptography courses, where students learn not only theory but also how to code modern cryptographic methods like DES and classic ones such as the Ceaser Cipher or Vigenère.

Throughout these courses, students are often required to learn new languages independently, such as Python, Assembly, or Verilog. It is precisely this wide range of environments that builds their technical and problem-solving skills. The program's focus on teaching and reinforcing foundational concepts enables students to learn independently and continuously assess and improve their abilities in their respective fields.

While this may all sound like technical aspects of learning, I can assure you it is not. Throughout these classes, from the basic core required courses to the graduate-level courses, students can expect to work in groups of 2–6 to solve problems and complete projects by the deadline. Whether it's creating a phone app for an Android device, researching wireless technology exploits and flaws common in 802.11, 4G, or 5G, or even building a multi-stage MIPS processor from scratch, these experiences give students the chance to collaborate, build PowerPoints, write reports, come up with solutions, and identify new ways of doing things. All of this can be expected during one's time at Iowa State.

These collaborative experiences shape students in this field and prepare them to succeed in their capstone project—a year-long course where students work in small groups and collaborate with industry professionals to design and implement new technologies using the school's resources. An example is my group's senior design project, where we have been tasked

with designing a first-of-its-kind database and querying program. This program imports simulated binary star interactions using the output of a multinational program called POSYDON. To achieve this, our team is building a custom Structured Querying Language (SQL) database and implementing a browser-based program using React and Python, allowing users to query the database with pre-built query options or natural language via Generative AI APIs.

This project showcases our accumulated skills in learning new languages and technologies independently, without the direct assistance of classrooms. It tests our technical abilities and our teamwork, as the project is far too large for a single individual to complete alone. Through the first semester of planning, prototyping, diagramming, and generating reports and presentations, we have set ourselves up for success in the coming months. We look forward to developing a more finalized, functional project that astrophysicists, educators, and students will use to understand how these stars interact and how their properties can help study anomalies in our universe.

In conclusion, my journey at Iowa State has culminated in technical and personal growth. It has been a transformative experience that has shaped me personally and professionally. Iowa State's comprehensive and hands-on learning techniques have equipped me with the hard and soft skills necessary to succeed in the ever-evolving field of cybersecurity and engineering. This capstone project stands as a testament to the educational experience that has shaped me into who I am today and demonstrates that the skills I have learned will help me succeed in whatever I pursue. An engineer is not just a title or trade but a holistic view of an individual who can apply advanced problem-solving techniques, combining hard and soft skills to tackle any challenge. Whether it's mathematics applied to algorithms, English applied to technical documents, or the

ability to adapt and think on one's feet, an engineer is always evolving and always ready for change, and this is the story of my Cumulative Experience at Iowa State University.