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CPR E 4940

Cumulative Reflection

My education at Iowa State has gone far beyond equations, programming assignments, and lab reports. It has equipped me with the ability to view engineering problems holistically, balancing technical precision with ethical, professional, and societal considerations. From designing secure systems in cybersecurity labs to developing complex applications like CyFinder, a backend system using Spring Boot, MySQL, and Hibernate, I have gained practical experience in building functional, secure, and collaborative solutions. Testing endpoints with Postman, managing REST API workflows via GitHub, and ensuring proper password security reinforced not only technical rigor but also an awareness of the ethical responsibility inherent in handling sensitive data. Through countless team-based projects, I strengthened my ability to collaborate, communicate persuasively, and integrate diverse perspectives to produce stronger solutions. These experiences have fostered a mindset that views engineering not merely as “building,” but as designing systems that protect people, uphold ethical standards, and ensure long-term societal impact.

Much of my growth came from digging deeper than what was presented in class. For example, in my forensic analysis project, I sought out professional journals and online repositories to understand tools like Autopsy and NetworkMiner more thoroughly. During the Cyber Defense Competition, I applied classroom knowledge to a dynamic, team-based environment, leveraging documentation, peer discussions, and real-world case studies to identify vulnerabilities, secure systems, and respond to live threats. Similarly, attending career fairs allowed me to engage with professionals in cybersecurity, ask targeted questions, and learn how the skills I was developing in class—such as system analysis, secure coding, and ethical decision-making—translate into industry practice. These external experiences not only elevated my technical proficiency but also gave me confidence in applying knowledge to unfamiliar scenarios, strengthened my professional communication, and reinforced the importance of lifelong learning in the ever-evolving field of cybersecurity.

Outside of lectures, I also found immense value in student organizations, research, and career fairs. Participating in competitions like the ISU Cyber Defense Competition exposed me to real-world, fast-paced problem solving. Career fairs challenged me to refine how I present myself and taught me the value of professional networking. Even informal peer learning—helping teammates debug code or sharing strategies for system hardening—instilled the importance of continuous learning. These experiences pushed me to embrace risk-taking, try new tools, and build skills I never imagined myself using when I first arrived at Iowa State.

Adaptability became a defining theme of my college experience. In labs, I often had to pivot when initial plans failed, refining technical solutions on the fly. During my internship, I applied my ISU training to quickly master new systems in a professional environment, demonstrating that my foundation prepared me to keep learning. Whether it was adapting to new programming languages, leadership opportunities, or complex forensic analysis, each challenge reinforced the importance of evolving my skill set.

Looking back, there are areas of my journey I would approach differently. If I could retrace my steps, I would prioritize time management and networking earlier. I now understand how powerful it is to connect with faculty, peers, and industry professionals, and I wish I had been more proactive from the beginning. Another aspect of my college career that I would reconsider is taking CPR E 381 and COM S 309 in the same semester. The heavy workload of both courses taught me resilience and perseverance, but balancing them simultaneously was an overwhelming challenge. That said, the lessons I learned through trial and error have shaped me into someone who values resilience, persistence, and adaptability above perfection.

One of the most challenging yet rewarding learning experiences I faced was in CPR E 381, where I had to grasp the intricacies of pipelining and hazards in computer architecture. At first, the diagrams, timing charts, and discussions about data hazards and forwarding felt overwhelming. My initial strategy was to rely heavily on lecture notes, but I quickly realized that passive reading was not enough. To truly understand the material, I began redrawing pipeline diagrams myself, walking through each instruction cycle by cycle to see where stalls or hazards occurred. I supplemented this by working through additional practice problems outside of homework, often comparing solutions with peers to see how different approaches led to the same outcome. Over time, the abstract ideas became concrete, and I began to see how architecture concepts directly impact processor performance. This process taught me not only how to break down complex material into manageable steps, but also how persistence and active engagement are essential for mastering difficult topics.

Some of my proudest moments came when I translated theoretical knowledge into practical applications. At the Cyber Defense Competition, I applied what I had learned about network security to configure pfSense and Wazuh under live attack conditions. Seeing our defenses hold was tangible proof that classroom concepts could directly protect systems in the real world. Similarly, creativity guided me in my forensic project when I used scripting to automate repetitive tasks, transforming what could have been hours of manual work into efficient workflows. These moments underscored the value of bridging theory with practice and demonstrated how creativity and adaptability often lead to the most effective solutions.

Over the course of my studies, my learning strategies also evolved significantly. Early in my journey, I leaned heavily on rote memorization and exhaustive note-taking. However, as subjects grew more complex, I realized the need to engage with real tools, simulations, and collaborative discussions. I shifted from writing down every bullet point to taking more strategic notes and devoting greater energy to hands-on practice. This change not only deepened my understanding but also gave me the confidence to approach new and unfamiliar problems.

As I look to the future, I recognize the need to further strengthen my expertise in red teaming, penetration testing, and advanced cybersecurity research. I plan to continue developing through certifications, hands-on labs, and industry experience. My strategy is to balance technical mastery with strong communication skills so that I can bridge the gap between engineers and executives. Lifelong learning will remain my cornerstone, ensuring I stay adaptable as technology and threats evolve.

My time at Iowa State has been more than just a collection of classes, it has been a transformative journey of growth, resilience, and discovery. I leave not only as an engineer, but as a lifelong learner, equipped with the tools to face challenges with creativity, adaptability, and integrity.