# Reflection Essay

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## INTRODUCTION

Over the course of my studies, I have developed strong skills that have significantly improved my abilities and prepared me for a career in cybersecurity. Among these, my proficiency in programming and Linux systems, network design, and analytical writing and research stands out as the most significant. These skills grew out of an interdisciplinary curriculum that combined computer science, systems administration, networking theory, and social science research. Each skill reflects a different aspect of professional readiness: solid technical skills, the ability to think through systems and networks, and the capacity to communicate ideas clearly. This essay will look at specific artifacts that demonstrate these skills, what I learned from completing them, and how they prepared me for a career in the field.

## SKILL 1: PROGRAMMING AND LINUX SYSTEMS

One of the most important skills I developed during my studies is proficiency in programming and Linux systems. Through my coursework, I gained hands-on experience with Linux environments, scripting, and troubleshooting. Learning to navigate the command line, manage permissions, and write efficient scripts strengthened not only my technical abilities but also my problem-solving skills. Programming and Linux knowledge are highly valued in cybersecurity roles, and mastering them has given me the confidence to manage systems, implement setups, and adapt to new technical challenges.

My growth in programming and Linux is clearly reflected in three key artifacts. The first is a Python calculator I developed in CS115, which allows users to perform basic arithmetic operations while handling invalid input and errors like division by zero. This project has helped

me focus on writing code that is reliable, user-friendly, and logically structured. The second artifact is a shell script I created in CYSE270 using Kali Linux, which performs conditional checks on numbers and files, manages the creation of new files, and validates directory names. Completing this assignment strengthened my understanding of Linux environments and scripting logic, while also teaching me how to automate tasks effectively. The third artifact is a digital steganography project from CYSE301, where I securely hid a text file within a cover image using steghide, encrypted it, and successfully extracted and verified the hidden data. This project reinforced the importance of precision, attention to detail, and practical application of security principles when handling sensitive information. These artifacts showcase how my programming and Linux skills have prepared me to handle technical challenges in real-world cybersecurity settings.

**SKILL 2: NETWORK DESIGN**

Another critical skill I developed during my studies is network design. Through hands-on projects, I learned how to plan, configure, and troubleshoot network systems while keeping security and efficiency in mind. This skill taught me to think beyond individual devices and consider how networks function as a whole, including traffic flow, connectivity, and potential vulnerabilities. A strong understanding of network design is valuable for cybersecurity roles that involve protecting infrastructure, implementing secure architectures, and ensuring systems communicate reliably. Developing this skill has given me the foundation to approach complex network challenges with confidence and a structured mindset.

Designing and implementing networks in different settings challenged me to think critically about connectivity, security, and efficiency. The first project showcased is a wired network I designed for Maury High School in IT315, which included outlet placement, cabling, switches, patch panels, and budgeting for all materials and equipment. I also implemented a firewall and VLANs to separate staff and student traffic, creating a secure, efficient, and cost-conscious network. The second project is a home network setup, also from IT315, where I drew from my own home network, which included a modem, router, and connected devices such as my computer, TV, tablet, and phones. This setup helped me understand internet distribution, device roles, and Wi-Fi coverage in a practical environment. The third artifact is a LAN design lab in CYSE250 using Cisco Packet Tracer, where I connected three PCs through a hub and used the PDU/OSI tool to trace an ICMP ping between devices. Each of these assignments strengthened my ability to plan networks thoughtfully, troubleshoot problems effectively, and apply security considerations in real-world scenarios.

**SKILL 3: ANALYTICAL WRITING AND RESEARCH**

Analytical writing and research is another key skill I honed during my studies. Through interdisciplinary projects, I learned how to gather, evaluate, and synthesize information from multiple sources, then present it clearly and effectively. This skill helped me approach complex topics methodically, connect ideas across disciplines, and communicate findings in a professional way. Strong analytical writing and research abilities are highly valuable in cybersecurity, where clear documentation, thorough analysis, and evidence-based decision-making are crucial. Developing this skill has strengthened both my critical thinking and my ability to convey technical information to different audiences.

The development of my analytical writing and research skills is evident in three key projects. The first is a paper on autonomous vehicles in CS562, where I analyzed cybersecurity risks, system vulnerabilities, and emerging threats, while exploring solutions like encryption, secure updates, and industry standards. This project taught me how to evaluate complex technical systems and present solutions clearly and logically. The second artifact is an examination of the NIST Cybersecurity Framework in CYSE425W, where I explored its five core functions and how it helps organizations shift from reactive to proactive cybersecurity practices. Working on this assignment strengthened my ability to connect theory with practical application and understand frameworks in real-world contexts. The third artifact is a legal analysis completed in CRJS406, which evaluated procedures for seizing and searching digital devices, including the use of warrants and the plain view doctrine. This project reinforced the importance of attention to detail, proper research methods, and clear communication when analyzing regulations that impact cybersecurity practices. These artifacts highlight how my analytical writing and research skills have prepared me to assess, communicate, and solve complex problems in the cybersecurity field.

**CONCLUSION**

Looking back on my studies, the combination of programming and Linux systems, network design, and analytical writing and research has given me a well-rounded foundation for a career in cybersecurity. Each skill was shaped by different courses and projects, allowing me to approach problems from multiple perspectives and apply interdisciplinary thinking. The hands-on projects, papers, and assignments helped me develop both technical expertise and the ability to communicate complex ideas clearly. Courses like IDS 300W strengthened my research and

writing abilities, which complemented the technical skills I gained in other classes. Overall, these experiences taught me to analyze problems critically, create practical solutions, and communicate effectively, all of which are vital for success in the cybersecurity field.