Reflective Essay

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Abstract

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With four years of college experience at two institutions, I've gained massive amounts of experience. When writing this, I find it rather strange, this will be my final work as an undergraduate, and looking back at my goals, aspirations, projects, and work has been an enlightening experience. My schooling wasn't traditional by any means, having been homeschooled most my life, and having to endure COVID during my early college career. Despite this, I've been exposed to many topics, techniques, and practices throughout college classes, clubs and work experiences. All of this has culminated in who I am today. There are three stark skills I've learned throughout my time at ODU I'd like to highlight, as I use them daily. These three skills are Coding and Scripting, Interdisciplinary Writing, and Technical and Critical thinking. This paper will cover each skill at a high level, explaining their significance, then providing artifacts to substantiate my claims. As my undergraduate career ends, it's been essential to self-reflect on the important plethora of experiences that have molded me into who I am today.

Skill One: Coding and Scripting

The field of cybersecurity is more than just static firewall rules and long-term policies, handling continuous and ever-present threats. In cybersecurity, there is a slew of ancient and arcane technologies constantly clashing with newer protocols and systems. Its imperative cybersecurity students are able to create programs that can work as patchwork or stopgap solutions. From the university to the field, I've created scripts that have served a myriad of purposes. These scripts I've been able to create have real-world applications, optimizing company workflow in a practical setting. The artifacts below highlight this, displaying work I've

done to enhance company operations. With ever-changing conditions in cybersecurity, the skills I learned to create solutions on demand have proven extremely useful.

Artifact One: ONVIF Singular Identifier Project

While working, I ran into an issue regarding cameras. We had too many. From fisheye to PTZ (pan, tilt, zoom) cameras, dome to bullet cameras, they all came from various manufacturers; industry titans like Axis and Vivotek all the way to smaller brands like Hanwha and i-Pro, the number of cameras was sometimes debilitating. It became necessary to be able to access these cameras remotely, bypassing their unique/tedious user interfaces, just getting the basic information and specifications off the camera. To do this, I wrote a purpose-built script that prompts users for login. Once logged in, it would leverage an industry standard known as ONVIF, or Open Network Video Interface Forum, and grab basic information off the camera. Usernames, technical specifications, and even intermittent pictures of the camera's image were given to the user for easy identification and troubleshooting. The script was lightweight and streamlined camera maintenance and troubleshooting. Being one of my finest works, the script displays my ability to create niche scripts to complete or assist the completion of tasks.

Artifact Two: MAC/IP Scanner + ONVIF Scraper Project

As previously mentioned, my work has a multitude of cameras. As an IT company, we have many network devices. Switches, firewalls, routers, computers, servers, and our network cameras are everywhere on our network. For my role, I must keep a large database of just the cameras to lend them to our engineering department. Before I started working in customer operations, that task was handled manually, with workers typing in updates to cameras or positioning on a large google sheet. This task was tedious, with cameras constantly being given

new IP addresses, much time was spent keeping the database up to date for the engineers. I was tasked with creating an automated solution. What I came up with was a MAC/IP scanner. A MAC, or Media Access Control, is a unique ID given to all network devices. Consider it a static, home address that cannot change. An IP address, or Internet Protocol Address, can change based on a lease time. My solution involved scanning the network and reaching out to all devices, identifying those who shared a similar MAC address to the camera manufacturers' slated MAC addresses. If the program came across a MAC address that matched the whitelist, it would catalogue the IP address. Once all IP addresses on the network had been reached out to, and the IP addresses logged, the script would login to each camera using a universal username and password, and then through ONVIF, get all the information off the cameras. This solution has saved countless hours, having been automated to ensure efficiency. This task taught me how to take large tasks and break them up into smaller objectives.

Artifact Three: Google Sheets Code

With most of my work, I must handle tons of data. Using mysql, the scripts, and many other devices, there's always an influx of unending information. IPconfigure, the company I work for, has a large workforce that must collaborate with one another on projects or tasks. They must always be on the same sheet of music, as to avoid miscommunication or errors. Our company employs many of Google's services to enable real-time collaboration and data sharing. I was requested to make a script that took information I gathered from cameras and upload it to google sheets. The script I wrote leverages many built-in services from google, but all revolve around an API key that takes data off of my text files and translates them into the google sheet. The script acts in a supporting role, not proactively creating data or useful information. The

project enabled me to work with interfacing other mainstream service with my scripts, allowing greater horizons.

Skill Two: Interdisciplinary Writing

Cybersecurity is an interdisciplinary field, going far beyond bits, wires, hexadecimal and WiFi. Cyber practitioners handle law, research, and communication daily whilst completing their tasks. As an interface between technical aspects of security and non-tech savvy higherups, and sometimes the public, it's important that those in the cybersecurity field have writing skills to properly convey points. Many classes at ODU have reinforced this notion through various writing prompts and assignments. Students like me have had a multitude of opportunities to write about issues affecting cyber, law as it pertains to cyber, as well as reflecting on cyber coursework. I've personally seen practical use with this skill, writing to professors, peers, and management at work about cyber related issues and solutions. I'm not a master by any means, but the foundation provided by ODU, as seen through my artifacts, has allowed me to be extremely flexible and professional in my writing.

Artifact One: Final Internship Paper

This behemoth of a paper required great amounts of self-reflection and analyzing my work environment, ensuring I could convey skills I'd acquired as well as the work I completed during my semester. The internship class was definitely one of the more fun classes I took during my tenure at ODU, allowing me to work in a role within cyber and document my time within it. The final task was drafting a self-reflection paper, examining my job, the company history, and growth I'd had throughout it. Similar to this paper, it involved self-reflection on the skills I brought with me to the role, skills I'd refined, and skills I gained whilst working. I discussed

various aspects of the work environment; the managerial style, work procedures, and how external stressors affected my workflow. The assignment forced me to not pigeonhole myself into one aspect of my work, but to critically analyze from a high-level perspective. The assignment taught me the importance of review and reflections, allowing me to dig deep into my personal failures and how I grew from those experiences.

Artifact Two: Privacy Case Analysis

This artifact is part of one of the most intensive writing classes done throughout my degree track at ODU. Cybersecurity Ethics tasked students to engage with various ethical concepts such as utilitarianism, ubuntu and ethics of care while researching diverse legal quandaries. With this artifact, I wrote on the conundrum of Privacy in the digital age, pulling from an issue Google faced with their street view application. When first releasing their application, there was an outroar from certain communities globally on the program's total exposure scheme. Countries like Japan explained the cultural significance of property and the home; it being private and not for the public to pry and search for. Writers were not only to give their opinion on the matter but also explain their reasoning through an ethical tool and academic research. I stated that google should provide a sweeping ability to blur one's home on google street view in a way that wouldn't hurt the functionality of getting directions from the application. I further argued that utilitarianism, or the betterment of many, would be a fair way of approaching the situation. Writing assignments like this forced me to write in a more unbiased way, relaying the situation, then giving an emotion free substantive argument for or against the topic.

Artifact Three: CYSE 201s Article Review

For this artifact, I followed the ramifications of cyber attacks on college and university education systems. The paper spurred research into the social aspect of cyber, looking at the deeper importance of these institutions. Usually, one thinks of cyber as cold cables and firewalls, but the "person aspect" of cyber attacks permeated the paper. The paper involved diving into training and preparedness of communities on cyberattacks. On top of this, it highlighted the importance of communication between universities and other public organizations in the thwarting of cybercriminals and attacks.

Skill Three: Technical and Critical Thinking

At the heart of cyber, it's important to have strong technical and critical thinking acumen. There's a necessity to have a strong technical foundation complimented with the ability to think deeply about complex issues. Throughout college, I've had multiple internships and courses that have given me the opportunity to flex both of these abilities. I've been armed with knowledge gained from security+ and network+, certifications obtained whilst going through the college curriculum. With this knowledge, I've been able to break down large tasks and requirements into bite sized issues, being invaluable in the problem-solving process. The artifacts below are only a few of the many assignments I've done at work and in class, allowing me to solve problems on a deeper level.

Artifact One: Maury High School Case Analysis

IT 315's Maury High School Case project was one of the most difficult assignments during my fall 2024 semester. The class consisted of various labs pertaining to budgeting, planning, and network topologies, all of which involved advanced thinking. At the end of the semester, I and other students were challenged to create a new local area network for a local

Norfolk high school, Maury. It was a very fun exercise, involving the “purchase” of cable and network appliances, measuring the distance of cable runs, and creating special policies for faculty and student network usage. The artifact submitted covers the maps, budget, and rack diagrams I created throughout the project. When I received 100% on the project, I was instilled with confidence that as long as I put my mind to something, I was sure to succeed.

Artifact Two: Password Cracking Assignment

Sadly, this artifact was so large, I had to break it up into multiple PDFs. CYSE 301 put students in the role of both attacker and defender; creating scenarios for students to break into or reinforce network infrastructure. One unique assignment was that of password cracking. I was tasked to leverage Metasploit, a hacking platform to break into computers, steal their information, and take pictures of other sensitive materials. I was able to exercise my critical thinking skills in this project, as the assignment required students to harken back to older projects and homework and employ tactics learned in them. The assignment also wasn’t straightforward, with the instructions and path being unclear at times. All this to say, it as very rewarding upon logging into and stealing the credentials of each victim virtual machine. The assignment flexed critical and technical thinking skills, instilling greater persistence and determination in me.

Artifact Three: Macy’s Hardware Project

My role at work is a special one, where I work on various ‘proof of concept’ (POC) ideas for potential clients. One project in particular was for Macy’s, a nation-wide department store. Our task was to analyze Macy’s current security posture, identify security camera technologies, and see if we could integrate them into our own framework. As we toiled away through months of research, we began to realize the gravity of the PoC. The department store we

were assigned to utilize cameras older than me and old network protocols lost to time. After trial and error, however, we were able to jerry rig solutions and hammer out a proper understanding of their security solution. It all culminated in us being able to successfully animate one of their dead cameras and have it work alongside our own network solution. The artifact I provided is a collage of my research, broken up into various PDFs. The primary artifact though is a video, that shows our ability to reach out to the camera and activate it, display video, and input basic commands.

Closer

Looking back on my collegiate career has given me tons of memories. Struggle, strife, successes, failures; there have been tons of moments that have molded me into who I am today. College and the job that spurred from my internship have taught me a wide variety of skills. Hopefully this essay was able to illuminate them and reinforce them with tangible artifacts. From coding to writing, I've gained so much from my college experiences, and hope to only grow once I leave academic walls. Reflection is essential when growing, improving, and re-evaluating yourself, with assignments like this reflective essay serving as vital tools to implement healthy evaluation and change.