

## Summative Assessment 3: Individual Reflective Piece

Network Security June 2024

*Word count: 849*

### **E-portfolio:**

<https://busilas.github.io/eportfolio/module4.html>

## **Individual Reflective Piece**

### **What?**

As a student enrolled in the MSc in the Computer Science program, the Network Security module has been an enlightening experience. The process of navigating through this module can be likened to perfecting the art of operating a soundboard and equalizer on a musical mixing console. A delicate balance between skills and knowledge is necessary to achieve optimal results in both areas. The module's key learning outcomes include comprehending the history of network security, identifying vulnerabilities, assessing advanced persistent threats (APTs), conducting breach analysis, and evaluating the impact of future trends, such as generative AI, on network security (Hutchins et al., 2011).

A standout critical incident was our case study on the SolarWinds breach, in which we applied the Cyber Kill Chain model to this contemporary APT. This exercise was pivotal in bridging the gap between theory and practice, demonstrating the relevance of the model in addressing modern security challenges (Temple-Raston 2021). Another significant hands-on activity was the vulnerability assessment of the Zero Bank website (<http://zero.webappsecurity.com/>) using tools such as OWASP ZAP, Burp Suite, and Nmap, as well as verifying compliance with GDPR and PCI DSS standards. This practical experience is critical for transferring theoretical knowledge to real-world circumstances, emphasizing the significance of ongoing monitoring and evaluation (Bhatt, 2018).

### **So What?**

The analogy between a soundboard and an equalizer perfectly exemplifies the delicate equilibrium necessary for network security. Each topic covered in the module serves as a distinct knob or slider, which must be adjusted for optimal security. For instance, understanding the history of network security is akin to recognizing foundational sounds in music production, which is essential for identifying patterns and anomalies (Hutchins et al., 2011). Advanced persistent threats are analogous to unexpected feedback that disrupts the mix, necessitating precise adjustments to eliminate them. Feedback from peers and tutors played a vital role in refining my comprehension of and approach to intricate security issues. Constructive criticism and collaborative discussions have enhanced my analytical skills and reporting techniques. For example, peer evaluations of my vulnerability assessment report highlighted areas for improvement in my analysis, much like a sound engineer receiving feedback on the clarity and balance of their mix.

Scanning the Zero Bank website was particularly informative. Utilizing various tools provided unique insights into potential weaknesses akin to different filters or effects on a mixing console. This exercise emphasizes the significance of a comprehensive view of system vulnerabilities, aiding the development of a robust security strategy (Magnusson, 2020; Bhatt, 2018).

## Now What?

Advancing the expertise and information gained from this module will play a crucial role in my continued growth as a network security specialist. The following is a comprehensive strategy for applying these skills:

*Table 1. Skills.*

Learning	Description
Time Management	Efficiently managing time is crucial for handling multiple security tasks simultaneously, such as regular updates, patches, and monitoring, without compromising overall security posture.
Critical Thinking and Analysis	I will continuously analyze network traffic, logs, and alerts to identify potential security threats and vulnerabilities, similar to a sound engineer critically listening to each component of a track.
Communication and Literacy Skills	Effective communication is essential. I will ensure that security policies, reports, and incident responses are conveyed clearly and comprehensively to all stakeholders.
IT and Digital Skills	Mastering security tools and technologies is like understanding the various effects and plugins on a mixing console. Continuous learning and staying updated with the latest security trends and tools will be a priority.
Research Skills	Conducting thorough research will help in understanding emerging threats and developing effective mitigation strategies.
Interpersonal Skills	Collaboration is key in both fields. Working effectively with colleagues, sharing knowledge, and learning from others will enhance the overall security posture of any organization I work with.
Problem-solving Skills	Solving security issues requires a systematic approach to identify, analyze, and resolve incidents, similar to troubleshooting sound problems.
Ethical Awareness	Upholding ethical standards is crucial in both music production and network security. I will adhere to legal and ethical guidelines while ensuring the privacy and security of sensitive information.

## **Artefacts and Learning Outcomes**

Throughout this module, I generated a variety of artefacts such as vulnerability assessment reports, breach analysis documents, and collaborative discussion summaries. These artefacts showcase my ability to evaluate security threats, utilize appropriate tools, and effectively convey findings. The Zero Bank website scanning activities were particularly noteworthy, highlighting my ability to perform comprehensive security assessments and recommend actionable mitigation strategies (Magnusson, 2020).

One important learning result is the capacity to identify and analyse security risks and vulnerabilities in network systems. For example, during the Zero Bank vulnerability assessment, OWASP ZAP and Burp Suite were employed to uncover significant weaknesses, such as adjusting an equalizer to identify and isolate specific frequencies that may cause feedback. This hands-on experience has solidified my understanding of how to utilize different tools to manage and solve security issues effectively.

Another critical learning outcome was the design and evaluation of computer programs and systems to manage audit risk and security issues. Working on various practical assignments, such as creating vulnerability assessment reports and breach analysis documents, taught me how to synthesize information from multiple sources, including Internet security alerts and warning sites, in the same way that a sound engineer would combine different sound elements to create a harmonious track.

Understanding the legal, social, ethical, and professional challenges confronting information security and risk professionals is another critical component of this curriculum. Discussions concerning the ethical consequences of security breaches, as well as organizational legal duties, were especially insightful. These discussions highlight the importance of maintaining ethical standards and legal compliance in all

security practices, akin to adhering to ethical guidelines in music production to ensure fair use and copyright compliance (Schwartz & Janger, 2007).

## **Conclusion**

The Network Security module has been a pivotal experience, similar to acquiring proficiency in operating a musical-mixing console. The combination of theoretical expertise, practical abilities, and professional development insights provided me with the skills necessary to navigate the intricate terrain of network security. Moving forward, I will continually refine my abilities, much like a sound engineer perfecting a mix, to guarantee robust and dependable security solutions.

This journey has not only enhanced my technical prowess but also emphasized the significance of ethical considerations and professional obligations in the realm of network security. By incorporating the lessons learned and continuously adjusting to emerging threats and technologies, I am self-assured of my ability to contribute positively to the ever-changing field of network security.

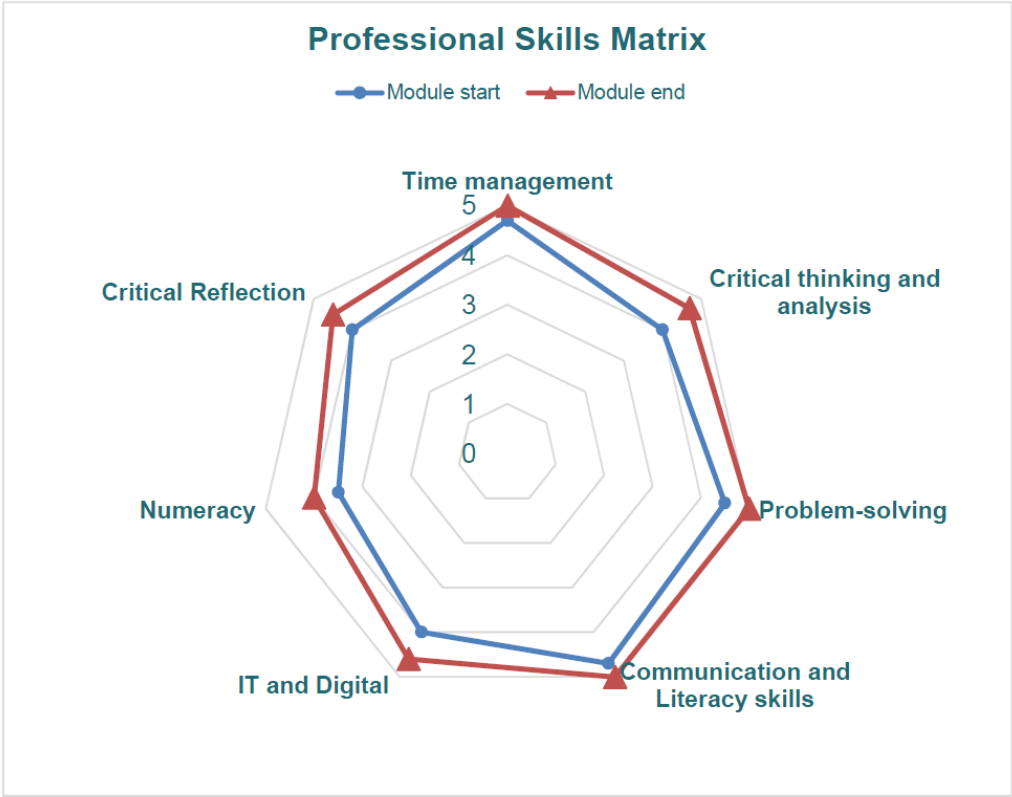
## Reference list

- Magnusson, A. (2020) Practical vulnerability management: A strategic approach to managing cyber risk. San Francisco, CA: No Starch Press, Inc.
- Bhatt, P. (2018). Practical Approach to Vulnerability Management: 2nd Edition. Apress.
- Hutchins, E. M., Cloppert, M. J., & Amin, R. M. (2011). Intelligence-driven computer network defense informed by analysis of adversary campaigns and intrusion kill chains. *Leading Issues in Information Warfare & Security Research*, 1(1), 80.
- Schwartz, A., & Janger, E. (2007). Notification of Data Security Breaches. *Michigan Law Review*, 105(5), 913-984.
- Temple-Raston, D. (2021). The SolarWinds Hack. National Public Radio (NPR). Available at: <https://www.npr.org/2021/06/21/1006783219/the-solarwinds-hack>.

# Professional Skills Matrix

Date: 2024.07.22  
Student name: Andrius Busilas

Skills	Module start	Module end
Time management	4.7	5
Critical thinking and analysis	4	4.7
Problem-solving	4.5	5
Communication and Literacy skills	4.7	5
IT and Digital	4	4.6
Numeracy	3.5	4
Critical Reflection	4	4.5



## Professional Development Plan

Date: Andrius Busilas

Student name: 2024.07.22

### Planned training

Training	Provider	Link to course	Development objectives	Status	Timeline
CS50's Introduction to Programming with Python (CS50 Python)	Harward University	<a href="https://cs50.harvard.edu/python/2022/">https://cs50.harvard.edu/python/2022/</a>	<ol style="list-style-type: none"><li>1. Acquire foundational programming skills through an introductory course focusing on Python, including reading, writing, testing, and debugging code effectively.</li><li>2. Cater to individuals with varying levels of programming experience to foster learning specifically in Python.</li><li>3. Master core programming concepts such as functions, arguments, return values, variables, types, conditionals, Boolean expressions, and loops.</li><li>4. Develop proficiency in handling exceptions, debugging code, writing unit tests, utilizing third-party libraries, validating data with regular expressions, and manipulating files.</li><li>5. Gain practical experience in modeling real-world entities using classes, objects, methods, and properties.</li><li>6. Emphasize hands-on practice through exercises inspired by real-world programming challenges to reinforce learning.</li><li>7. Provide flexibility in coding environments, enabling participants to utilize a web browser or individual PC/Mac for coding purposes.</li></ol>	Completed	Dec 2023 - Apr 2024
100 Days of Code: The Complete Python Pro Bootcamp by Dr. Angela Yu	Udemy	<a href="https://www.udemy.com/course/100-days-of-code/">https://www.udemy.com/course/100-days-of-code/</a>	<ol style="list-style-type: none"><li>1. Explore a diverse range of tools and technologies within the Python ecosystem, including Python 3, PyCharm, Jupyter Notebook, Python Scripting, Web Development, Data Science, GUI Desktop App Development, Version Control, Backend Web Development, and deployment strategies.</li><li>2. Develop competence in key Python libraries and frameworks such as Pandas, NumPy, Matplotlib, Flask, REST APIs, SQL databases, authentication mechanisms, and web design principles, fostering a well-rounded skill set as a Python developer.</li></ol>	Ongoing	Nov 2023 - Now
CS50's Introduction to Computer Science (CS50x)	Harward University	<a href="https://cs50.harvard.edu/x/2024/">https://cs50.harvard.edu/x/2024/</a>	<ol style="list-style-type: none"><li>1. Develop problem-solving skills with an emphasis on correctness, design, and coding style, encompassing both code-based and non-code-based solutions.</li><li>2. Delve into computational thinking, abstraction, algorithms, data structures, and broader computer science concepts to enhance overall understanding.</li><li>3. Work on problem sets inspired by various disciplines to foster creativity and interdisciplinary learning.</li><li>4. Learn fundamental programming principles that transcend specific languages, enabling the ability to adapt and learn new languages independently.</li><li>5. Begin with the foundational language C to grasp core concepts such as functions, variables, conditionals, loops, and gain insights into computer architecture and memory management.</li><li>6. Progress to Python, building on the understanding gained from C, and later explore SQL for database management, along with HTML, CSS, and JavaScript for web and mobile app development.</li><li>7. Conclude the course with a final project that integrates learned skills and knowledge into a practical application, showcasing proficiency in programming and problem-solving.</li></ol>	Ongoing	Feb 2024 - Now



CS50's Introduction to Cybersecurity (CS50 Cybersecurity)	Harvard University	<a href="https://cs50.harvard.edu/cybersecurity/2023/">https://cs50.harvard.edu/cybersecurity/2023/</a>	<ol style="list-style-type: none"> <li>1. Gain an introductory understanding of cybersecurity suitable for both technical and non-technical individuals.</li> <li>2. Learn essential strategies to protect accounts, data, systems, and software from current threats and develop skills to anticipate and assess future threats in personal and professional settings.</li> <li>3. Acquire knowledge on safeguarding personal privacy in the digital realm.</li> <li>4. Develop a nuanced perspective on cybersecurity, viewing it as a balance between risks and rewards for adversaries and costs and benefits for oneself.</li> <li>5. Recognize the trade-off between cybersecurity measures and usability, emphasizing the importance of finding a balance between security and user experience.</li> <li>6. Comprehend cybersecurity threats through a mix of high-level and low-level examples to ensure a comprehensive technical understanding.</li> <li>7. Engage in assignments inspired by real-world cybersecurity incidents to enhance practical</li> </ol>		start from Jun 2024
CS50's Introduction to Databases with SQL (CS50 SQL)	Harvard University	<a href="https://cs50.harvard.edu/sql/2024/">https://cs50.harvard.edu/sql/2024/</a>	<ol style="list-style-type: none"> <li>1. Utilizing SQL as the primary language to build foundational knowledge on data management.</li> <li>2. Master the essential operations of creating, reading, updating, and deleting data within relational databases, structured in rows and columns.</li> <li>3. Develop skills in modeling real-world entities and establishing relationships among them through tables equipped with appropriate data types, triggers, and constraints.</li> <li>5. Learn techniques for normalizing data to enhance efficiency, eliminate redundancies, and minimize the risk of errors in database operations.</li> <li>6. Acquire proficiency in joining tables using primary and foreign keys, facilitating efficient data retrieval and manipulation.</li> <li>7. Explore advanced concepts such as using views to automate searches and indexes to optimize search performance.</li> <li>8. Understand the integration of SQL with other programming languages like Python and Java to enhance versatility and interconnectedness in data management.</li> <li>9. Begin with SQLite for portability and progress towards PostgreSQL and MySQL to delve into scalable database solutions, ensuring adaptability across different environments.</li> </ol> <p>Engage in assignments inspired by real-world datasets to apply learned concepts in practical</p>	Ongoing	Feb 2024 - Now
CS50's Web Programming with Python and JavaScript (CS50 Web)	Harvard University	<a href="https://cs50.harvard.edu/web/2020/">https://cs50.harvard.edu/web/2020/</a>	<ol style="list-style-type: none"> <li>1. Enhance proficiency in designing and developing web applications using Python, JavaScript, and SQL, with a focus on frameworks such as Django, React, and Bootstrap.</li> <li>2. Gain in-depth knowledge and skills in database design, scalability, security, and enhancing user experience in web applications.</li> <li>3. Develop practical expertise through hands-on projects involving writing and utilizing APIs, creating interactive user interfaces, and utilizing cloud services like GitHub and Heroku.</li> <li>4. Acquire the ability to independently design and deploy web applications by the end of the personal development plan, demonstrating mastery of key principles, languages, and tools essential for internet application development.</li> </ol>		Start from Aug 2024

CS50's Introduction to Artificial Intelligence with Python (CS50 AI)	Harvard University	<a href="https://cs50.harvard.edu/ai/2024/">https://cs50.harvard.edu/ai/2024/</a>	<ol style="list-style-type: none"> <li>1. Enroll in a course focusing on the fundamental concepts and algorithms underpinning modern artificial intelligence, targeting a deeper understanding of technologies like game-playing engines, handwriting recognition, and machine translation within a defined timeline.</li> <li>2. Engage in hands-on projects to apply theoretical concepts in practice, exploring graph search algorithms, classification, optimization, machine learning, large language models, and other key topics in artificial intelligence through the creation of Python programs.</li> <li>3. Utilize project-based learning to enhance knowledge and skills in machine learning libraries, enabling practical application and implementation of artificial intelligence principles in personalized programming projects.</li> <li>4. Cultivate expertise in utilizing libraries for machine learning and integrating artificial intelligence principles to develop intelligent systems, fostering the capability to design and construct innovative solutions informed by AI technologies.</li> <li>5. Develop a comprehensive understanding of the core principles and methodologies governing artificial intelligence through practical application and experimentation, ensuring proficiency in designing intelligent systems and leveraging AI techniques effectively.</li> <li>6. Focus on incorporating artificial intelligence concepts and algorithms into Python programs, reinforcing the connection between theory and practical implementation in order to strengthen overall proficiency in AI development.</li> <li>7. Complete the course with a robust portfolio of hands-on projects showcasing expertise in machine learning libraries and practical application of artificial intelligence concepts, demonstrating readiness to tackle complex AI challenges and design intelligent systems of their own.</li> </ol>	Start from Nov 2024
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