

## **Title: Individual Reflective Piece**

### **Introduction**

Reflecting on my journey through the Network Security module of my MSc in Computer Science, I feel both challenged and enriched. This module has not only improved my technical skills but also significantly impacted my professional and personal development.

### **Summary of Learning Outcomes**

Throughout this module, I explored various aspects of network security, including legal, social, ethical, and professional issues faced by information security and risk professionals. The module covered techniques for scanning, evaluating, and mitigating network vulnerabilities, providing a solid understanding of vulnerability assessment basics, especially in web applications. Key assignments included conducting a Vulnerability Audit and Assessment, presenting the results in an Executive Summary, and reflecting on personal development.

The assignments required a deep dive into real-world applications of network security principles. For example, the first **Baseline Analysis and Plan assignment** for the Gin & Juice Shop (G&J) project taught me how to analyze network vulnerabilities in detail and develop a comprehensive plan for assessment. The subsequent **Results and Executive Summary assignment** helped me communicate technical findings to non-technical stakeholders effectively. These tasks, though challenging, provided invaluable insights into the practicalities of network security.

The formative activities, such as the **Literature Review Activity** (Appendix 1) in Unit 2 and the **Scanning Activity** (Appendix 2) in Unit 3, provided a step-by-step approach to performing the vulnerability assessment for G&J. They also enhanced my technical skills for scanning and auditing and my understanding of compliance requirements, such as the General Data Protection Regulation (GDPR) and Web Content Accessibility Guidelines (WCAG). Before these activities and assignments, I was not aware of the accessibility requirements mentioned in WCAG. Now, it has become a practice for me when maintaining my e-portfolio during my MSc Computer Science journey.

This module also enhanced my awareness of ethical issues in vulnerability disclosure and the use of ethical hacking, emphasizing the importance of responsibility and accountability in all security practices.

Feedback from peers and tutors was crucial, enhancing my critical thinking and understanding of contemporary network security challenges. Collaborative discussions, such as those on the digital economy and log4j vulnerabilities, broadened my perspective. Tutor critiques on assignments refined my analytical and communication skills, improving my work quality.

### **Professional Skills Matrix and Action Plan (PDP)**

The knowledge and skills developed during this module, such as conducting network vulnerability assessments with various tools, drafting assessment reports and executive

summaries, and understanding GDPR and WCAG, are invaluable. Specifically, GDPR compliance is directly transferable to real-world scenarios in my current role as Data Protection Officer, where I can implement the strategies and tools learned during this module. The knowledge of how to issue an assessment report makes it easier to communicate between top management and information technology teams.

### **Professional Skills Matrix**

<b>Skill</b>	<b>Description</b>	<b>Level Before Module</b>	<b>Level After Module</b>	<b>Evidence</b>
Time Management	Managing time to meet deadlines and balance workload	Intermediate	Advanced	Completed assignments on time despite high workload during staggered modules period.
Critical Thinking and Analysis	Evaluating information to make well-informed decisions and solve problems	Intermediate	Advanced	Applied critical thinking in project evaluations and literature reviews.

Communication and Literacy Skills	Collaborative discussion and idea presentation	Basic	Intermediate	Participated in discussions, created baseline analysis and plan, executive summary, and maintained an e-portfolio.
IT and Digital	Discover various scanning tools and platforms	Basic	Intermediate	Used Burp Suite and other tools to complete the scanning activity.
Research	Conducting literature reviews and applying findings	Basic	Intermediate	Conducted vulnerability analysis literature review for assignments.
Interpersonal	Reflecting on experiences to identify strengths, weaknesses, and areas for improvement	Basic	Intermediate	Maintained an e-portfolio with reflections and learning outcomes for each unit.

Problem-Solving	Developing and implementing effective strategies to resolve issues	Intermediate	Advanced	Looked for alternative solutions when the existing resource could not complete the activity requirement.
Ethical Awareness	Reflecting on ethical implications of security practices	Basic	Intermediate	Studied GDPR and WCAG, which enhanced my awareness of data protection and the importance of accessibility for websites.

### **Action Plan**

Moving forward, I aim to continue enhancing my skills in network security by:

- Engaging with Advanced Topics: Exploring advanced topics in network security and data protection.
- Practical Application: Applying the knowledge gained to real-world projects, particularly in my current role.
- Continuous Learning: Staying updated with the latest tools and techniques in network security through continuous education and professional development.

- Ethical Practices: Implementing ethical considerations and best practices in all security-related projects.

## **Conclusion**

In summary, the Network Security module has been a transformative experience. It has equipped me with essential technical skills, fostered a deeper understanding of reflective practice, and significantly impacted my professional and personal development. As I move forward, I am committed to applying the knowledge and skills gained to real-world projects, continuing my learning journey, and contributing to the field of network security.


Reflecting on this journey has been enlightening, helping me to consolidate my learnings and prepare for future challenges. The experiences and insights gained will undoubtedly serve as a strong foundation for my ongoing growth and success in the field of computer science.

## References

Di Silvestro, F. & Nadir, H. (2021) The Power of ePortfolio Development to Foster Reflective and Deeper Learning in an Online Graduate Adult Education Program. *Adult Learning* 32(4):154-164.

University of Essex Online. (2024) *University of Essex Online Writing Guide Series – A short guide to Reflective Writing*. Essex: University of Essex Online.

## Appendix 1 Literature Review Activity

 [https://helenhelene.github.io/eportfolio/NS/NS\\_Unit02\\_LiteratureReview.html](https://helenhelene.github.io/eportfolio/NS/NS_Unit02_LiteratureReview.html)

# Vulnerability Analysis – Literature Review Activity

## Introduction

This activity conducts the literature review as preparation for the Assignment 1 “Vulnerability Audit and Assessment - Baseline Analysis and Plan” on Gin & Juice Shop Ecommerce.

## Identified Vulnerabilities

Based on a literature search, the following potential vulnerabilities were identified for the Gin & Juice Shop website:

Sources: OWASP Top 10, CWE List.

1. **Broken Access Control (CWE-200, CWE-284):**
  - Unauthorized access and information disclosure.
2. **Cryptographic Failures (CWE-259, CWE-327, CWE-331):**
  - Exposure of sensitive information.
3. **Injection (CWE-73, CWE-79, CWE-89):**
  - Execution of malicious commands or scripts.
4. **Insecure Design (CWE-209, CWE-256, CWE-501, CWE-522):**
  - Poor security control design leading to vulnerabilities.
5. **Security Misconfiguration (CWE-16, CWE-611):**
  - Improper security settings causing information exposure.
6. **Vulnerable and Outdated Components (CWE-1104):**
  - Exploitation of known vulnerabilities in third-party components.
7. **Identification and Authentication Failures (CWE-287, CWE-297, CWE-384):**
  - Unauthorized access.
8. **Software and Data Integrity Failures (CWE-494, CWE-502, CWE-829):**
  - Attacks on software updates, data integrity, and insecure deserialization.
9. **Security Logging and Monitoring Failures (CWE-117, CWE-223, CWE-532, CWE-778):**
  - Delayed incident detection.
10. **Cross-Site Request Forgery (CSRF) and Server-Side Request Forgery (SSRF) (CWE-352, CWE-918):**
  - Unauthorized actions on authenticated users and unauthorized access to other systems.



## Appendix 2 Scanning Activity

 [https://helenhelene.github.io/eportfolio/NS/NS\\_Unit03\\_Scanning.html](https://helenhelene.github.io/eportfolio/NS/NS_Unit03_Scanning.html)

### Scanning Activity

#### Introduction

This activity conducts the basic scan using standard tools such as Traceroute / Tracert and Nslookup as preparation for the Assignment 2 "Vulnerability Audit and Assessment - Results and Executive Summary" on [Gin & Juice Shop Ecommerce](#).

#### Scanning Output

##### Tracert (Windows)

```
C:\WINDOWS\system32\cmd.exe
(c) Microsoft Corporation. 著作權所有。並保留一切權利。
C:\Users\Helen Siu>tracert ginandjuice.shop

在 30 秒內完成
跟踪 ginandjuice.shop [34.249.203.140] 的路由:

  1  *          *          *          要求每跳返回:
  2  159 ms    159 ms    158 ms    172.20.21.234
  3  159 ms    159 ms    160 ms    172.20.22.3
  4  *          *          *          要求每跳返回:
  5  160 ms    160 ms    161 ms    unn-212-102-46-70.cdn77.com [212.102.46.70]
  6  *          *          *          要求每跳返回:
  7  182 ms    181 ms    183 ms    be2005.ccr21.slc01.atlas.cogentco.com [154.54.2.190]
  8  191 ms    193 ms    192 ms    be3037.ccr21.den01.atlas.cogentco.com [154.54.41.146]
  9  203 ms    204 ms    203 ms    be3035.ccr21.mia01.atlas.cogentco.com [154.54.5.90]
 10  214 ms    214 ms    216 ms    be2811.ccr41.ord01.atlas.cogentco.com [154.54.42.166]
 11  220 ms    *          222 ms    be2717.ccr21.cle04.atlas.cogentco.com [154.54.6.222]
 12  236 ms    235 ms    232 ms    be2878.ccr21.alb02.atlas.cogentco.com [154.54.26.130]
 13  236 ms    236 ms    235 ms    be3599.ccr31.bos01.atlas.cogentco.com [66.28.4.238]
 14  304 ms    304 ms    306 ms    be3393.ccr51.lhr01.atlas.cogentco.com [154.54.47.142]
 15  306 ms    306 ms    302 ms    a100-row.denarc.cogentco.com [149.14.196.218]
 16  *          *          *          要求每跳返回:
 17  *          *          *          要求每跳返回:
 18  *          *          *          要求每跳返回:
 19  *          *          *          要求每跳返回:
 20  *          *          *          要求每跳返回:
 21  *          *          *          要求每跳返回:
 22  *          *          *          要求每跳返回:
 23  *          *          *          要求每跳返回:
 24  *          *          *          要求每跳返回:
 25  *          *          *          要求每跳返回:
 26  *          *          *          要求每跳返回:
 27  *          *          *          要求每跳返回:
 28  *          *          *          要求每跳返回:
 29  *          *          *          要求每跳返回:
 30  *          *          *          要求每跳返回:
```

##### Nslookup

```
C:\Users\Helen Siu>nslookup -type=NS ginandjuice.shop
伺服器: 57.172.252.162.in-addr.arpa
Address: 162.252.172.57

未經授權的回應:
ginandjuice.shop      nameserver = ns-1543.awsdns-00.co.uk
ginandjuice.shop      nameserver = ns-1000.awsdns-61.net
ginandjuice.shop      nameserver = ns-110.awsdns-13.com
ginandjuice.shop      nameserver = ns-1496.awsdns-59.org

C:\Users\Helen Siu>nslookup -type=MX ginandjuice.shop
伺服器: 57.172.252.162.in-addr.arpa
Address: 162.252.172.57

ginandjuice.shop
primary name server = ns-1496.awsdns-59.org
responsible mail addr = awsdns-hostmaster.amazon.com
serial = 1
refresh = 7200 (2 hours)
retry = 900 (15 mins)
expire = 1209600 (14 days)
default TTL = 86400 (1 day)

C:\Users\Helen Siu>nslookup ginandjuice.shop
伺服器: 57.172.252.162.in-addr.arpa
Address: 162.252.172.57
```