Secure Software Development Reflection

The ‘Software Secure Development’ module was one of the most challenging and insightful components of my MSc in Computer Science. As my second module, it provided an in-depth understanding of security vulnerabilities and cybersecurity threats. The experience significantly broadened my knowledge, equipping me with practical skills to address real-world security concerns. Before I delve into my reflections on the module, you can find my e-portfolio here.

In the early units, I frequently felt overwhelmed and concerned about keeping up with the numerous activities, many of which were entirely new to me. For instance, prior to this module, I had no experience creating a portfolio. Although I had designed mock projects during the early stages of my career as a software engineer, this e-portfolio was far more significant, serving as a critical component of my academic journey.

One of the key challenges was creating a design document, where we were required to form a team and collaborate. While the design was a group effort, the actual development of the application was an individual task. When I initially reached out to join a team, I found that they were not accepting new members, which added to my worries. I feared I might end up in a team where I would be responsible for most of the work, carrying a disproportionate share of the tasks.

Moreover, I was not expecting to develop a full application with complex components like database integration, API support, etc. so early in the program. The concern arose not only because it was my second module but also because, for many of my peers, it was their first. Developing a secure application requires a solid understanding of foundational concepts such as programming languages, object-orientated principles, databases, and system architecture. Additionally, the application requirements were often unclear, which added to the complexity of the task.

By the end of the first unit, we had established a team of three—Adriaan, Hristo, and myself. Hristo volunteered to be the team lead, and we all agreed. Despite our differing time zones, we scheduled regular meetings to work on the design document. Initially, we struggled with understanding the requirements and guidelines posted in the module announcements. However, after clarifying our queries with Anupam, our module tutor, we were able to overcome these challenges.

We chose to design an online retailer application. The work distribution and collaboration within the team were smooth and effective, allowing each of us to contribute at our own pace. We would review the collaborative sections during our calls and refine them afterwards. By the middle of Unit 6, we had a draft ready, and after some final adjustments, we submitted it.

Although we did a great job overall, I believe some sections could have been more thoughtfully planned. For instance, our UML diagrams could have been designed more

effectively. Additionally, some of the functional requirements, such as storing users' credit card details or promoting a regular user to an admin role, were unnecessary. The emphasis should have been more on security aspects rather than functional ones. I should have taken the initiative to begin planning the application’s implementation earlier. Nonetheless, I thoroughly enjoyed working with them, and it was a rewarding team experience overall.

My favourite activity in the module was working on the online retailer application. I made a deliberate decision to skip certain requirements outlined in the design document, as they did not align with my architectural design principles. I was particularly excited to focus on the security requirements and began development soon after submitting the design document. Initially, I was hesitant about integrating the API, but I motivated myself to tackle API integration, understanding that this requirement would provide valuable learning opportunities. I implemented logic for conducting brute force and API injection attacks, and with the limited knowledge I had, I also mocked a DDoS attack.

I believe I did an excellent job developing the application; however, upon reflection, I made several avoidable mistakes. For instance, my database tables would reset each time the application started. After countless debugging sessions and a thorough line-by-line review, I realised that it was functioning exactly as I had instructed. This issue arose because I forgot to remove the test queries I had written while verifying the database functionality. I recognise that I should have been more careful when working with the database.

In Unit 1, when tasked with creating an e-portfolio, I chose a static HTML template to get started. While I consistently updated it as I progressed, the template's static nature became a challenge. Making template-level changes required significant effort, as I often found myself repeating HTML code. Instead of opting for a static template, I should have considered using a dynamic framework or a content management system. This approach would have allowed for easier updates and better organisation.

The collaborative discussions were often insightful, and I genuinely enjoyed participating in them and learning new concepts. However, they sometimes lacked engagement, likely due to work commitments and time zone differences. This was particularly evident during my first experience writing a summary post, as no one had posted before me. Although I had no reference points to guide me, I managed to compile my thoughts along with my peers' contributions into a cohesive summary. I made an effort to contribute regularly and ensure that I met all deadlines.

Despite the challenges I faced, the knowledge I've gained will be invaluable in developing secure applications in my work as a software engineer. This experience has not only enhanced my technical skills but also provided important psychological insights. I learned that by focusing on what I do know, I can often navigate and resolve what I don’t know without even realising it. Overall, this module has been a significant step in my academic and professional journey, and I look forward to applying these lessons in the future.