University of Essex
Post Graduate Certificate in Computer Science

Unit 3: Secure Software Development

End of Unit Reflections

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Unit Reflections

This course has been a long, hard journey for me. I undertook it as a CPD exercise and to enable me to return to teaching and be confident in delivering Computer Science up to A Level standard. I should have completed this Unit last year, however, deferred it due to reasons I will not go into.
I have found the course extremely useful and I have developed lots of skills, particularly in coding, this has perhaps been the best Unit.

I have found the codio area difficult to work in and resources were not up to standard and need to be checked. I also believe the Learning Objectives and Outcomes should be clear on the website. There appeared to be a Unit Overview with outcomes and then separate outcomes against some tasks, this was confusing.

Distance learning is not the ideal way to do this course, being in a classroom environment, helps you to build better relationships with other and support each other. I found that I mainly worked in isolation and this was not much different during the Team Project. I appreciate it I to develop certain skillsets, however, when everyone works full time and have significant time differences, this did not work.

In Unit 1 looked at concepts such as waterfall and agile approaches to secure software development.
I researched A06:2021-Vulnerable and Outdated Components identified by OWASP as a as coding weakness and created a flowchart of the steps which may have led to the weakness occurring. I then posted it onto the forum, however, I did not get any replies/review other than the professor.

In Unit 2 I had the opportunity to developing practical skills in flow charts. To help with this we were asked to review a fellow student's Initial Post. I was not able to do this due to work commitments.
I did research Scrum Modelling and posted a Blog regarding people being the biggest risk to cyber security. I also got to communicate with my allocated Team and set up a platform for us all to meet.

In Unit 3 I studied the history, concepts and design that led to the languages we have today. Programming languages are important and skills I want to develop not only for teaching but also for the Coding Output Team Project.
I researched Secure Programming Languages, and found Python was secure and however, not better than than C in creating operating systems.
I further improves my coding skills through using Python tools and features and The Producer-Consumer Mechanism; a programme that ran multiple threads and making this programme more secure.

In Unit 4 I learned about the effect of key programming concepts on system security. I had the chance to further study regular expressions (regex) and recursion. I developed more Python skills through coding exercises using regex on post codes and recursion to solve the Tower of Hanoi puzzle.

In Unit 5 I furthered my knowledge through carrying out Equivalence Testing in Python. I also carried out research on Cyclomatic Complexity and its relevance.

In Unit 6 I carried out a variety of tasks using Linters, using PyLint, flake8 and mccabe. I did have issues with these as the code needed to be corrected prior to carrying out the tasks. This was a busy week as our Team had to hand in our Design Document.

In this Unit I worked on my Python coding skills through creating a simple Python shell and investigated potential vulnerabilities and how to mitigate these. As well as this I learned about TrueCrypt and created an Ontology. The Ontology was not correct and I amended it and created a new diagram after further research.

Unit 8 developed my knowledge in cryptography and how it is used with operating systems. I created a cipher programme that could encode and decode a sentence, which is a useful programme that can be taught in computer science lessons.

In Unit 9 I gained further Python skills by creating an API, and using that API, by carrying out tasks in a terminal and logging results. I did find these quite challenging and struggle to get it to work, however I was able to overcome this.

In Unit 10 I studied system architectures including monolithic deployments to microservices, virtualisation, and containers. I learned how the use of more distributed modes of operation can lead to increased attacks. I researched the techniques to increase system security, particularly looking at faceted data and how to go about creating one in Python.

In Unit 11 I wrote an article debating Microservices and Microkernels as part of the Tanenbaum-Torvalds Debate. His week was stressful as our Team also submitted our coding output assignment and communication was at time difficult due to the time differences and as we all had full time jobs.

In Unit 12 I was going to post my article, however as no other person on the course submitted one I have not. You can read my article in Unit 11.

This was a busy week as I had to ensure my eportfolio was completed and submit it. This has been a difficult task and there needs to be a better overview of what each Unit should have on their respective page/section.

Overall I have enjoyed the challenge of the Secure Software Development Unit as I have been able to develop many skills. I was a secondary IT and Computer Science teacher, prior to the pandemic and I wanted to return to this, however, I felt I needed to upskill myself before returning to the profession in September 2023. I am now much more confident in computer science and hope to take the knowledge and skills I have developed to teach and inspire young learners to pursue the study of this and a career in IT.