**Reflection**

**WHAT?**

During the course of the module of Secure Software Development (SSD), I was able to participate in a variety of activities that empowered my technical and professional skills. At the beginning of the module, I investigated the UML flow-chart modelling and analyzed one of the most significant OWASP vulnerabilities, which is SQL Injection. Visual Paradigm taught me the insecure coding habits, including combining user input directly into SQL, which provides the chance to exploit a potential vulnerability massively. This knowledge formed the basis of our assignment, and my group and I started developing our Secure Music Copyright Application in Unit 3.

In the group project, I contributed UML diagrams, design rationale, and general system architecture. Other tasks I carried out were writing sections of the introduction, vulnerability analysis, and team meetings. Another activity that I conducted was the peer-discussion forums, where I provided feedback on the weaknesses selected by fellow learners and discussed the purpose of design models in detecting security at the early stages. My peer review proved my competence as I continued to contribute to the ideas, support other colleagues, and communicate with them.

**SO WHAT?**

Observing and critically thinking, the project made me experience emotional and critical challenges that identified my strengths and weaknesses in recognizing teamwork and ensuring development security. Initially, I was a little lost in the richness of the secure design principles, at least in the way in which the UML, cryptography, and design patterns are connected. As time has passed, I understand that the effect of structured modelling massively minimizes ambiguity and assists in forecasting security lapses at an early stage, and this is, in most cases, the best practice (Booch et al., 1994).

Collaborating with peers helped me become more confident. I was encouraged when groupmates appreciated my input more, so when I discussed project outlines and spots of vulnerabilities. This interprofessional setting showed the value of psychological safety in technical teams and was similar to literature that states that trust improves innovation and problem-solving (Gottlieb et al., 2017)

Nevertheless, the module also helped me to realize that there were times when I might have been more active, and especially engaged in spearheading discussions or assigned tasks strategically. More importantly, the SQL Injection test revealed to me the ease with which tiny flaws in code can grow into immense threats, which is why the concept of secure-by-design solutions backed by UML is worth pursuing (Halfond, Viegas and Orso, n.d.)

The cyclic feedback system (peer reviews, tutor feedback, and even automated tools like Bandit) made it possible to get my knowledge of safe code syntax perfected. It also pointed to the fact that the practice of a professional needs to go beyond merely writing functional code to creating resilient systems that are ethically conscious.

**NOW WHAT?**

Secure software development is almost entirely an attitude issue rather than a matter of technique, which is my major learning outcome. In the future, my strategy will be to enhance three key areas:

* Active team management in the workplace, in the sense that the chief engineer needs to start the conversation more frequently and call on the quieter members of the stockpile to contribute their ideas.
* Serious security design experience i.e. the ability to integrate threat modelling in earlier and more strategic patterns of application.
* Further involvement of automated security tools to be certain that the coding and testing are in accordance with the best practices of the industry.

The enhancements will help me in my future work in secure environments of development where accountability, cooperation, and technical discipline are needed. In conclusion, this module enabled me to switch beyond software building to thinking cap as a security-conscious developer, an idea that I will be bringing along with me whenever I work on a project in the future.

**Reference:**  
Booch, G., Henderson-Sellers, B., Jacobson, I., Mellor, S., Rumbaugh, J. and Wirfs-Brock, R. (1994). Methodology standards. *ACM SIGPLAN Notices*, 29(10), pp.223–228. doi:https://doi.org/10.1145/191081.191115.

Gottlieb, M., Grossman, C., Rose, E., Sanderson, W., Ankel, F., Swaminathan, A. and Chan, T. (2017). Academic Primer Series: Five Key Papers about Team Collaboration Relevant to Emergency Medicine. *Western Journal of Emergency Medicine*, 18(2), pp.303–310. doi:https://doi.org/10.5811/westjem.2016.11.31212.

Halfond, W., Viegas, J. and Orso, A. (n.d.). *A Classification of SQL Injection Attacks and Countermeasures*. [online] Available at: https://viterbi-web.usc.edu/~halfond/papers/halfond06issse.pdf.

Rolfe, G. and Freshwater, D. (2001). Critical reflexivity: A politically and ethically engaged research method for nursing. *NT Research*, [online] 6(1), pp.526–537. doi:https://doi.org/10.1177/136140960100600109.

**Appendix:  
SWOT Analysis**

|  | Helpful  to achieving the objective | Hamper  achieving the objective |
| --- | --- | --- |
| Internal origin  (attributes of the system) | Strengths   1. Good knowledge of UML modelling tools (e.g., Visual Paradigm) and paid capacity to utilize them to reassess vulnerabilities to security attack schemes such as SQL Injection. 2. Effective cooperation skills as shown by answering people and participating in group discussions and contributing to seminars. 3. Knowledge on how to do research and comprehend security standards (e.g., OWASP, ISO/IEC) and apply them into designing work. | Weaknesses/Areas for further development   1. Lack of time management, as it has to be inadequately distributed over several seminars, readings, and team submissions. 2. Less familiar with automated testing tools (linters, bandit, Python test frameworks), must take some training. 3. Should have more confidence practicing the advanced practices of secure-coding, and not just the basic examples in the modules. |
| External origin (attributes of the environment) | Opportunities   1. Complete module study resources (lecturecasts, readings, UML tools, customers developing exercises, etc.) to reinforce secure knowledge of development. 2. Capability of peer learning and learner group learning via discussions and feedback over the seminars. 3. Contact with real-world comparable standard, practices of testing and future trends (IoT, CPS, fog computing) that boost employability. | Threats   1. There can be technical barriers in the form of complexity of cryptography, automation of testing and architecture of a distributed system. 2. There is a possibility of incorrect coordination or unequal involvement in team-building activities. 3. The overlapping of the assessments (Design Document + Reflection) and excessive workload per week were the sources of time pressure. |

**PDP**

**Where do I want to be by the end of this period/year? What do I want to be doing? (Include as many learning needs as required to achieve agreed objectives)**

| What do I want/need to learn?Provide a specific description of the desired changes (e.g. skills to gain, knowledge to acquire, topics/themes/content to cover) | What do I have to do to achieve this?Some examples, a new/ongoing course, conference, self-development (like wider research or reading), coaching/mentoring, job shadowing | What resources or support will I need?Some examples, teaching staff support, library support, student advisor support,line manager, etc. | How will I measure success?Some examples, appraisals, course assessments, team feedback, tutor feedback | Target dates for review and completionNote that these need to be realistic/achievable |
| --- | --- | --- | --- | --- |
| • Study and perform secure coding (input validation, parameterised queries, handling of APIs safely).  These are all the improvements in knowledge of OWASP Top 10. | Complete package of coding procedures (Unit 3–4).  • Use of good patterns in mini-projects civically.  • Study OWASP materials. | • Trainer support at seminars.  • Online OWASP resources.  • Responses of other educators in coding reviews. | • Better code quality of team project.  • Less vulnerabilities in the the linters/security tools. | Review: Week 5  Completion: End of module |
| Master UML (Flowcharts, class, and sequence, activity) diagrams.  • Study the UML revelation of security risks | Design Multiple drafts Visual Paradigm.  Examples of lectures should be reviewed. SQL Injection UML = Leave application to the user | • Access to Visual Paradigm.  • Unit 12 discussion tutor feedback. | • UML task positive peer/tutor feedback.  • UML correctly used in final design document. | Review: Week 3  Completion: Week 4 |
| • How to use Python testing tools (pytest).  • Master security automatics (bandit, linters). | Seminars Complete Unit 4 seminars.  • Established testing environment of the team project.  Test Suites Run Test suites on Mimomorphic code Run test suites on Ref test suites. | • Seminar support.  • Python documentation.  Peer assistance at team meetings. | Successful prototype tests developed.  The issues of security that are identified early.  Seminar review: tutor permission. | Review: Week 4  Completion: Week 5 |
| • Select proper communication in online teams.  • Be able to receive and give positive feedback. | • Be an active speaker in conferences and meetings.  Contributions to reflection: documents.  • Participate in frequent meetings. | • Team work software (Teams, GitHub).  • Seminar moderation by tutors. | Search: According to the best of my knowledge, the design Synthesis has been contributed to as in what follows:  • Positive peer feedback.  • definite role accomplishment in team. | Review: Weekly  Completion: End of project |

**Professional Matrix**

| **Competency** | **Essex Graduate Skill** | **Skill** | **Skill Level** | **Evidence** |
| --- | --- | --- | --- | --- |
| **Professional** | Literacy, Communication, Language Skills | Be able to communicate effectively with both technical and non-technical people. | **Trained** | Provided with several academic papers where I simplified technical knowledge to the general audiences, and made use of structured formats in order to enhance clarity. |
|  |  | Construct reports, diagrams, legal descriptions, plans, manuals, charts, etc. to facilitate communications. | **Trained** | Developed formatted course work reports and diagrams, such as workflow and technical documentation of the same to the required academic standards. |
| **Commercial Awareness** |  | Be abreast with industry technology and modernity. | **Aware** | I usually read articles on the technological front and keep up on the news on cloud computing, AI-related applications, and programming frameworks. |
|  |  | To improve and share knowledge of tools and technology seek opportunities to improve. | **Aware** | Collected useful materials with peers during group work and visited online tutorials in order to expand my knowledge. |
|  |  | Belong to scientific and professional organisations. | **Aware** | Attention to academic conferences and online meetings devoted to new technologies issues in an informal manner. |
|  |  | Focus on the quality, customer satisfaction and the just enforcement of policies. | **Trained** | Guaranteed assignments and group work were of quality and contributed in group decisions in a fair and balanced input. |
|  |  | Be conversant with the computing field codes of conduct. | **Aware** | Learned some ethical principles used in clinical databases like BCS guidelines in course units and applied them in written assignments. |
| **Subject Understanding, Research, Critical Thinking, Time Management** |  | Learners are expected to critically examine intricate concepts in Computer Science. | **Trained** | Case studies and research papers were analysed pointing out strengths, gaps, as well as, implications to practice. |
|  |  | Identify discrepancy and find out more. | **Trained** | During the assignments, I found inconsistent pieces of information or the lack of clarity of assumptions and tried to find reliable academic sources. |
|  |  | Learn the strategies of solving complex real-world problems within a computing setting. | **Aware** | Complete coursework scenarios, which also involved simulation of real-world system problems and suggestions of the possible solutions. |
| **Legal and Ethical** | Ethical Awareness | Comply with the letter and spirit of applicable laws | **Aware** | Study: Took computing modules related to GDPR, data protection, and ethical issues. |
|  |  | Provide privacy and confidentiality. | **Trained** | Principles of applied confidentiality of dealing with dummy datasets of coursework. |
| **Social (inc. Teamwork)** | Cultural Awareness | Work according to the interest of the community ( Social responsibility) | **Aware** | Reflects upon its impact and sustainability to society when offering computing solutions in assignments. |
|  | Teamwork, Leadership and Resilience, Time Management | Collaborate effectively in diverse teams to achieve team goals | **Proficient** | Played an active role in group work, and was an inclusive and respectful team player. |
|  |  | Achieving team goals through team work abilities. | **Proficient** | Served as an organizer in group work and was able to make sure deadlines were not broken. |
|  |  | Learners should show their leadership and team building skills. | **Trained** | Initiated group meetings and roles allocation when undertaking projects. |
|  |  | Give and receive constructive feedback | **Proficient** | Gave peers clear and respectful feedback and used tutor and group member feedback. |
|  | Creativity, Entrepreneurial, Problem solving, Initiative, Decision Making | Planning, negotiating and communicating sustainability plans. | **Aware** | Raised sustainability issues in project, and project discussion. |
|  |  | Eliminate biases when making judgments on complicated issues after consulting various sources. | **Trained** | Before making conclusions in assignments, selected various data sources and research articles. |
| **Technical (Data Science)** | IT and Digital, Numeracy | SQL for database querying | **Aware** | Carried out fundamental operations of SELECT, JOIN and filtering in the course of laboratory work. |
|  |  | Python Programming | **Trained** | Finished a number of exercises based on Python and data manipulation and little automation. |
|  |  | Java | **Aware** | Basic knowledge of syllables (Java) and object-oriented learners in grades 1 and 2. |
|  |  | noSQL | **Aware** | Mastered theory on conceptual differences between relational and non-relational databases taught. |
|  |  | Scripting Language (Python) | **Trained** | Wrote small scripts to handle data and files processing. |
|  |  | Statistical Language (R) | **Aware** | Verbal: Was requested to use R (introductory data analysis) in the lab. |
|  |  | Gits - repository development and maintenance | **Trained** | Cf Used GitHub to send assignments, keep versions, change tracker. |
|  |  | Use of conferencing technologies and Moodle (VLE) | **Proficient** | Frequently use VLE-tools, online-meetings, discussion forums and submission platforms. |
|  |  | Use of Word Processing tools and Spreadsheets | **Proficient** | Generated formatted documents and data managed using spread sheets in academic work. |
|  |  | Strategic utilization of e-library. | **Trained** | Searched articles in peer-reviewed journals in university libraries through assignments. |
| **Subject Application** | Global Citizen, Teamwork, Leadership, Emotional Intelligence | Consider the opinion of other individuals. | **Proficient** | Took into consideration the cultural and individual differences when working on a collective project and when discussing academic tasks. |
|  |  | Positively work with disagreeements in perspectives. | **Proficient** | Promoting discussion in groups and finding a solution to conflicts by offering evidence-based arguments. |
|  |  | Become a responsible citizen in a community. | **Aware** | Participated in university community areas and helped in debates concerning the role of technology in the society. |
|  | Decision Making, Initiative, Emotional Intelligence, Ethical Awareness | Establish and establish personal values and ethics. | **Trained** | Contemplated about the ethical issues in computing when doing course work and connected it to my own values. |