**3-2 Milestone Two: Enhancement One: Software Design and Engineering**

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In this narrative I will be explaining the enhancements I have made to my final project java code for CS320: Software Testing, Automation, and Quality Assurance. I will do this by answering the following prompts; first I will briefly describe the artifact, what it was and when it was created. Next, I will justify the inclusion of the artifact into my ePortfolio. Why I selected the item, what specific components of the artifact showcase my skills and abilities and how the artifact has improved. Thirdly, I will state if I met course outcomes, I wanted to meet in Module One. Additionally, do I have any updates on my outcome-coverage plans. Finally, I will reflect on the process of enhancing and modifying the artifact. I will state what I learned as I was creating it and what challenges I faced.

In this first section, I will briefly describe the artifact I am using for the Software Design and Engineering section. I am using my java code from the CS320: Software Testing, Automation, and Quality Assurance class. The java code I originally created for the class was for the purpose of testing the code, therefore the code lacks certain aspects one would see as standard for the type of program developed. The java code creates an arrayed list of contact information for people. Which in turn has a separate java class that manages this arrayed list. This was a set of java classes we used in the course to test, I believe using JUnit tests. This was created approximately a year or two ago for my coursework.

In this second section, I will justify my inclusion of this artifact into my ePortfolio. I selected this item because it allows me to display my clean coding abilities. It shows how I can write informative in-line statements, displays my ability to utilize object-oriented programming (OOP) principles. The specific components that are displayed are my abilities to write a code that does not crash or error because of a null and displays simple logic for creating entry level arrayed lists. This artifact has improved immensely because it shows that I now know how to write proper java code and use in-line commands to tell others what I am doing (or think I am doing); when I am writing my code.

In this section I will state if I met the course outcomes, I planned on meeting in Module One. In Module One I planned on meeting course outcomes 3, 4, and 5. Those being designing and evaluating computing solutions that solve a given problem using algorithmic principles, Demonstrating an ability to use well-founded and innovative techniques, skills, and tools; then finally I stated that I would develop a security mindset that anticipates adversarial exploits. I believe that I have covered the fifth outcome which is developing a security mindset when writing this code. This was done be using input validation and ensuring my program does not inadvertently crash due to null pointer exception. I also believe that I demonstrated an ability to use well-founded and innovative techniques and skills. An example of this is because I used the “Optional” handling for a potentially null value; within my Contact.java class. Based on my research, this is a modern approach to managing how my class handles the data set. Finally, I believe that I designed a computing solution to solve a given problem. The ContactService.java class effectively uses different methods to manipulate the data in an efficient manner. The use of an arrayed list shows I am able to understand performance concerns. If necessary for this course, I can also perform more enhancements to meet this criteria or the criteria of other course outcomes.

In this final paragraph, I will reflect on the process of enhancing and modifying my artifact. I learned so far, while creating and improving it, that a lot of the skills I have developed in the software engineering space are becoming more natural to me. In-line comments and secure coding practices seem like no brainers when I am constructing a method, class, or program. It feels good that coding practices I struggled earlier with seem easier to grasp now. The challenges I faced were looking into what people are currently doing with java. I believe that there is so much more for me to learn, and it was challenging trying to take it all in