CS 499 Enhancement One Software Design Engineering Narrative

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1. **Briefly describe the artifact. What is it? When was it created?**

   This artifact is an application that I developed in my CS320 class. This was created to practice creating test cases for an application using Junit. Therefore, the application is written in Java and utilizes the Junit Testing framework. This application features a contact and contact service class with their accompanying test classes. The contact class defines what a contact should consist of, and the contact service class defines methods that allow interaction with the contacts. Test classes for each of these ensure that all is working properly for both classes, including but not limited to testing the use of methods and variable limits.

2. **Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in software development? How was the artifact improved?**

   I chose to include this artifact in my ePortfolio as it showcases my ability to apply proper testing procedures when working on an application. Testing is something that is very important in the computer science field and is a skill worth showcasing in my ePortfolio. To improve the artifact, I migrated the application from Java to C++, in doing so I also had to update the Junit testing framework to the GoogleTest framework. In this processI had to adapt the application from utilizing Java based resources and procedures to C++.

3. **Did you meet the course outcomes you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?**

   I did meet the course outcome I planned to meet with this enhancement specifically I met the outcome of demonstrating an ability to implement techniques and tools in computer practices as well as implementing proper design as solutions. I demonstrated this through my use of tools like Google Test and utilizing proper testing techniques to verify the functionality of my application. Another outcome I met through this enhancement was creating and working

in a collaborative environment. Utilizing testing frameworks is often a core aspect in working with a team when developing and properly utilizing these frameworks in important. In this enhancement I demonstrated that I can properly utilize the google test framework in a collaborative way, for example by creating tests with clear names that demonstrate what the test is doing and what it is for. The last outcome I met through working on this enhancement was demonstrating my ability to work with security in mind and creating a secure application. While I have yet to implement specific security procedures, testing method and the application as a whole in order to ensure expected functionality is a core aspect of security as often times vulnerabilities occur during unexpected behavior. This is something that I have worked on ensuring through my work creating test classes. At this time, I do not have any updates I want to make to my outcome-coverage plan.

4. **Reflect on the process of enhancing and modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?**

While working on the artifact, I learned a good amount about working with C++ and how it differs from working with Java. While I am familiar with both languages, what I have done with them differs so while working on this enhancement I was able to learn how to accomplish this same thing I did in Java but in C++, familiarizing myself with their differences even more. One challenge that I did encounter is working with my delete method. In Java I utilized an iterator to delete the element I wanted from the array list. In C++ that same approach did not work while attempting to utilize the iterator in the same way I ran into an error that occurred because of deleting the element in the vector that the iterator is pointing to causing an error to occur when trying to utilize that position or positions past it in the vector. In my approach to solving this problem, in the hopes of working more efficiently, I decided to move onto my next enhancement with the idea of coming back to this problem with a different

headspace and perspective. This proved to be incredibly beneficial as while I was working on my second enhancement, I created a method that would search the vector list and return a specific element. I realized this approach is exactly what I needed for the delete method, so I implemented the same logic as my search method returns the element and then I just implemented logic that would delete that method. So, in the end I utilized the find_if function to search the vector and return a specific element if that contact ID was present. Then I used the erase function to delete that specific element. This approach avoided the error I was experiencing before as if deletion occurs there is no attempt to utilize the iterator position that was deleted or any after that point, as unlike my previous attempts I performed the erase method outside of the loop through the vector.