**Milestone Two**

**Enhancement One: Software Design/Engineering**

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

The artifact I chose to use is one of the first projects I completed when I started my journey at SNHU back in January or February of 2023. It is a text-based video game that I developed using Python in IT 140: Introduction to Scripting. The goal of the project was to develop a text-based video game that allowed a user to enter the text “Go North, Go South, Go East, or Go West” to navigate through a maze of rooms that was provided to us. We were able to decide the theme of the game, what each room would be, and what items would be available to collect in each room. Each room only had certain directions available depending on the direction of the openings displayed in the provided map. The player had to visit each room and collect an item to have everything necessary to kill the boss in the final room. If the player failed to collect all the items they would lose the boss fight, otherwise they would succeed.

1. **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 this artifact because it was a simple project with a lot of potential, and I knew that with more development knowledge and skills, I could take it much further. Even in its original form, the project demonstrated my ability to code in Python, write modular functions for specific tasks, and create well-organized, well-commented code that was easy to follow. I enjoyed building it and wanted to improve the user experience by making it more engaging. Since then, I’ve enhanced the project significantly by converting it from Python to C#, restructuring it into multiple classes and methods. I added a database to support user login, saving, and loading game states, which didn't exist before. I’ve also started building the interface using WinForms, separating the login and game screens into two forms for better organization. Security features like input validation, password masking, and character limits were added to the login screen, along with password hashing for secure storage and verification. I implemented error handling to avoid null values and improve performance, and used internal classes with private variables accessed through getters and setters to strengthen encapsulation. These improvements highlight my growth in software development, from basic scripting to building more complex, secure, and user-friendly applications.

1. **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?**

Yes, I met outcomes 3, 4, and 5 as I initially planned in Module One with my enhancement for the Software Design and Engineering category. To address outcome 3, I implemented object-oriented principles such as encapsulation by organizing the program into multiple classes, one called “Game,” which manages all game related functionality like room navigation, and another called “Player,” which handles player details and inventory updates. For outcome 4, I focused on improving the user experience by developing a graphical interface using WinForms, creating separate forms for the game and login screens. I also integrated SQLite to support user login functionality and game state management. Although I’ve completed the method for loading saved game data, I’m still working on implementing the method to allow users to save their progress. For outcome 5, I enhanced security by hashing user passwords before storing them in the database, which helps protect against security vulnerabilities. I also applied input validation to limit character entry and prevent SQL injection attacks, and added error handling to avoid null values that could lead to performance issues.

1. **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 enhancements for this category, I faced several challenges and gained valuable knowledge along the way. I learned how to create a dictionary in C#, which was more complex compared to Python and required some adjustment. I also learned how to build a class to handle password hashing and verification, which involved extensive research due to the many different approaches available. My initial attempt using BCrypt didn’t work, so I had to explore several alternatives before finding a reliable solution. Additionally, working with WinForms was entirely new to me, and although it presented many challenges, I was able to learn the tool through trial and error, which made the process both engaging and educational. After encountering some early performance issues, I figured out how to optimize the form by minimizing the number of controls and reusing them by updating their properties instead of creating new ones. These experiences have helped me grow as a developer and improve my problem-solving skills.