**Milestone Three**

**Enhancement One: Algorithms and Data Structures**

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 began as a simple project with a lot of potential, and I knew that with more development knowledge and skills, I could expand it significantly. 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 enhance the user experience by making it more engaging and interactive. To satisfy the Database category, I created a database using SQLite and integrated it into the project to allow players to create accounts and save their game progress. Players can now start a new game or continue from a saved state, a feature that did not exist in the original project. I developed methods to provide full CRUD functionality and connected these methods to buttons in the WinForms UI, allowing database actions to be performed directly through user interactions. The database includes two well-structured tables, one for user login details and another for tracking player progress. I designed both tables to enforce data integrity by preventing null values in critical fields and ensuring that primary key columns are unique. These design choices showcase my ability to implement effective schema design and input validation. I also demonstrated secure coding practices by using parameterized queries to protect against SQL injection attacks. Additionally, I ensured that the database tables are only created if they do not already exist and implemented logic to update an existing save rather than creating duplicate entries, maintaining data consistency by leveraging the unique username constraint. Through these enhancements, I’ve demonstrated my ability to design, implement, and securely integrate a functional database within a desktop application.

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 outcome 5 as I originally planned by securely storing hashed passwords instead of plain text, using parameterized queries to prevent SQL injection, and implementing input validation in the tables I created. I also satisfied outcome 2 by designing the UI to clearly guide users on which buttons to click for interacting with the database, making the interface easy to understand. Additionally, I satisfied outcome 4 by integrating a database to add new functionality and value to the game, enabling players to save and load their game progress which are features that were not part of the original text-based game.

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 encountered some issues when trying to save a players game state. There was an issue with saving a player progress because I changed the username column in my PlayerProgress table to unique after the table already existed so the change didn’t take. I discovered this by learning about DB Beaver and downloading the tool so I could view my SQLite database to see what my tables looked like. While reviewing my tables, I also discovered that the username was being passed in as blank when being called from my GameForm2 class which was also preventing the game state from saving correctly. To resolve the database issue, I deleted the existing PlayerProgress table so the table could be re-created properly with the username column as unique. For the coding issue, I created a public variable named playerUsername in the GameForm2 class to store the players username at the start of the game. This variable is now used whenever the username is needed as a parameter in other method calls within the class. Previously, I had been trying to use the username parameter passed into the GameForm2 constructor, but because it was scoped as a local parameter, it could only be accessed within that method. This was causing a blank value to be passed when the username was referenced elsewhere.