April Nixon

Southern New Hampshire University

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

Professor Maryann Krupa

July 20, 2024

**Enhancement One: Software Design and Engineering**

For this enhancement, I focused on improving the design and functionality of my Zoo Monitoring Project from IT-145. Originally, this Java program was developed to track zoo animals and their habitats. My enhancement plan included adding several features, such as a login system and employee records management. Although I initially intended to add a section for logging new incoming and outgoing animals, I had to drop this feature due to time constraints and the need to learn new methods for these enhancements.

I chose to include this artifact in my portfolio because it showcases my ability to refactor Java code to improve it on multiple levels. This project challenged me to manage my time effectively to incorporate several modular enhancements and organize their application while considering the interdependencies between these enhancements. This enhancement demonstrates my capability to enhance logic, design solutions, and improve existing code. The project was originally completed in late 2023, and revisiting it allowed me to relearn the functions of the code and enhance them further.

One significant rework was the main menu of the program.

**Original Main Method**

The original main menu was overly complex, making the main program more cumbersome than necessary. I simplified and streamlined the main menu in the new version, making it more structured and better suited to the new format.

**New Main Method**

The updated main system is sleeker and simpler, focusing on login verification and calling the main menu. The login system now verifies user credentials and retrieves the user's access level based on their username. This access level determines the options available to the user in the main menu.

**Switch within the New Main Menu**

The switch statement in the new main menu is based on the user's access level, ensuring that users only see the options they are allowed to access. This method helps protect personal information and limits user access to only what is necessary for their job level. Also, I added an Employee class that allows HR and admin personnel to retrieve employee records, including details such as name, hire date, position, salary, and the habitats maintained by zookeepers.

Another major rework involved changing from reading lines in a text document using a scanner to connecting to and reading from an SQL Server database. This enhancement took some time to perfect, as it was my first experience connecting to SQL Server outside of SQL Server Management Studio. It was a valuable learning experience, linking my academic knowledge with real-world job experience. Below is an example of the SQL logic used in the Login class, showing how the program checks login information against the SQL database.

**SQL Logic in Login Class Using JDBC**

This code snippet demonstrates how the login information from the main method is verified against the SQL database, making sure that only authorized users can access the system.

Future enhancements could include adding a graphical user interface (GUI) and applying different levels of access for zookeepers and HR personnel based on their responsibilities. This modular approach would allow for additional functions and features, such as adding, updating, and deleting records while maintaining accurate records. Instead of deleting records, a "deleted" flag could be used to indicate records that should only be shown when searching for deleted records, restricted to higher-level personnel.

All in all, this enhancement displays my ability to improve software design and engineering by refactoring existing code, integrating new features, and managing time and project complexity effectively.