The artifact:

The artifact is a Python class named ‘AnimalShelter’ designed to interact with a MongoDB database for performing CRUD (Create, Read, Update, Delete) operations on an animal collection. It establishes a connection to the MongoDB server using the `MongoClient` from the `pymongo` library, handles authentication, and ensures efficient data management through connection pooling and index creation. I created this code in March 2024 in my CS 340: Advanced Programming Concepts course. The class included methods for inserting new animal records, querying existing ones, updating records, and deleting entries. Additionally, it provided a method for generating test data, making it a comprehensive tool for managing an animal database in a structured and efficient manner. This artifact is useful for managing animal shelter records and can be adapted for similar database management tasks.

Inclusion of the artifact:

I included the ‘AnimalShelter’ Python class in my ePortfolio because it exemplifies my proficiency in software development, particularly in database management and backend programming. This artifact demonstrates my ability to design and implement robust CRUD operations using MongoDB, showcasing my skills in Python, data handling, and efficient connection management. It also highlights my understanding of authentication and indexing for optimized performance. The class was improved by incorporating connection pooling, adding error handling mechanisms, and creating an index for better read performance, reflecting my commitment to writing efficient and maintainable code. This artifact not only illustrates my technical abilities but also my problem-solving skills and attention to detail, making it a valuable addition to my ePortfolio.

Course Objective:

Yes, I met the course objectives I planned to meet with this enhancement in Module One. By developing and refining the ‘AnimalShelter’ class, I effectively demonstrated my ability to design and evaluate computing solutions using algorithmic principles and appropriate computer science practices. This enhancement showcases my skills in managing trade-offs involved in design choices and implementing efficient, secure data handling techniques. Additionally, it reflects my proficiency in using innovative tools and techniques in computing practices to deliver valuable industry-specific solutions. Currently, I have no updates to my outcome-coverage plans, as this artifact aligns well with my learning goals and course objectives, particularly in the areas of software development and database management.

Reflection:

Reflecting on the process of enhancing and modifying the ‘AnimalShelter’ artifact, I learned a great deal about the intricacies of database management and the importance of robust error handling and connection management in software development. As I was creating and improving the artifact, I deepened my understanding of how to use the ‘pymongo’ library to interact with MongoDB, and how to implement best practices for ensuring efficient and secure database operations.

One of the main challenges I faced was managing authentication and connection pooling to ensure the application could handle multiple requests efficiently without compromising security. Debugging connection issues and ensuring that the database operations were performed correctly under different scenarios required careful testing and validation.