5-2 Milestone Four: Enhancement Three: Databases

Stephen Zaferopolos

Southern New Hampshire University

CS499 Computer Science Capstone

08/03/25

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

The artifact for the third enhancement is yet another continuation of my work with the linked list application found in module three of CS260 “Data Structures and Algorithms”. In the second enhancement, there was a MongoDB database introduced to the link list application. This database provided a way to remove and save bids to a more permanent structure than a linked list, which is lost when application is closed. With the introduction of the database into the application, the linked list is no longer necessary. The third enhancement involves eliminating the linked list from the application and replacing its functionality with database management tools, enabling direct addition, removal, and search operations within the database. In addition to the database management functionality, a simple GUI was created using Tkinter, providing ease of use, and a little more sophistication to the artifact.

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 algorithms and data structure? How was the artifact improved?**

The inclusion of this artifact is intended to demonstrate my skill with database management. The application can receive documents from a CSV file and populate the collection of a cloud instance of MongoDB. The parsing of the CSV file checks to make sure no row of the CSV is duplicated before adding the data to the collection. The application includes basic tools to add, update, remove, and retrieve documents from a non-relational database, with each function verifying data before making any changes. This is intended to ensure data reliability. The addition of the GUI in Tkinter completes the improvement of this artifact creating a simple interface for a user than the menu driven cli based structure of the original.

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

With the third enhancement complete, the final course outcome of database skills and management has been achieved. The enhancement has taken an application that was originally designed to manipulate data in a linked list structure held in memory, and converted to a non-relational database, providing the same features and functionality as the original but with the added benefit of persistent storage of the data, and increased security from a CSV format the original data was originally stored in. Basic database tools for manipulating the data directly to and from the database has been developed, and a CLI interface has been upgraded to a Tkinter GUI.

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?**

The third artifact was the most challenging of the three enhancements. I decided to add a little more difficulty to the final enhancement. The third enhancement went beyond restructuring the functionality of the original application and taking it to a new level. Restructuring the tools from the original code designed to manipulate a list structure to database documents, was at first challenging, however, after the first method was completed, the rest fell into place. The biggest challenge I faced with this enhancement was the size of the code. Originally much of the code was created in a flat manner. The code became a little hard to read, so it was decided to go in a more object-oriented manner utilizing frames to organize the GUI, and multiple pop-up windows to keep the interface as uncluttered as possible. The change to the Object-oriented approach created a bit of a time crunch as the decision was made late in the week. While most of the functionality is there, the finished product will run overtime constraints, however, I believe it’s the correct decision, as it will make the code easier to read in the end.