

Mohamed Elhassan

CS 499 - Computer Science Capstone

Southern New Hampshire University

# **Narrative for Algorithms and Data Structures Enhancement**

## **Brief Description of the Artifact**

The artifact I'm focusing on for this enhancement involves integrating API calls to ChatGPT for workout data and storing meal plans and workout information in MongoDB. This part of the project was created as part of my final project for the course, where I worked on developing a full-stack web application (180S). The goal is to retrieve workout data dynamically from ChatGPT and save it, along with meal plans, in a MongoDB database to allow for easy retrieval and management.

## **Justification for Inclusion**

I selected this artifact for inclusion in my ePortfolio because it demonstrates key skills in software development, specifically in API integration, data manipulation, and database management. The artifact showcases my ability to handle asynchronous operations through API calls, parse and process data efficiently, and implement proper data storage solutions in MongoDB. This project also highlights my progress in backend development and database management, areas where I've been focusing to strengthen my skills.

To improve the artifact, I worked on implementing data storage for meal plans, which involved designing the database structure, optimizing it for retrieval, and integrating it with the frontend. The next step is to finalize workout data storage and implement queries that allow users to search and retrieve workout routines efficiently. These improvements directly support my learning in managing data efficiently and understanding how algorithms are applied in real-world software development.

## **Meeting Course Outcomes**

When I initially planned my course outcomes in Module One, I aimed to strengthen my understanding of algorithms and data structures, particularly in the context of backend development. This enhancement directly supports that outcome by allowing me to apply algorithms for handling and storing workout and meal plan data. The course outcomes I focused on include improving my database management skills, understanding how to work with asynchronous data, and learning how to handle large sets of data efficiently. There are still some elements to finalize, such as improving database querying and ensuring fast data retrieval for workouts, but I'm on track to meet these outcomes as I continue refining the project.

## **Reflection on the Process**

During the enhancement process, I learned a lot about how data is processed and stored in web applications, particularly when it comes to handling API responses and structuring databases. The challenge I faced was optimizing the data storage for workouts in MongoDB. I had to ensure that the data was normalized for easy querying, while also ensuring the application could handle multiple API responses without performance issues.

The most rewarding part of the process has been seeing how the integration of ChatGPT for workouts and the database interactions work together to create a dynamic system. I've also improved my ability to handle complex data in MongoDB, which is an important skill in full-stack development. The challenge of optimizing queries and ensuring smooth integration between the front-end and back-end will be the focus of my next steps.