The artifact I selected for the database enhancement is the CRUD module and dash-based dashboard that was done in CS 340. Originally it was made to interact with the Austin Animal Center dataset in a local MongoDB instance. The initial program had create and read options and showed some client-server communication but it did not follow any modern security practices, lacked authentication, and lacked indexing. For the enhancement I made it a more realistic and production aligned database system. The database is now MongoDB Atlas, it has secure password hashing with role-based authentication, there is safer input validation, and multiple indexes for efficiency. This takes it from an academic CRUD model to a fully featured cloud-ready database application.

This was chosen for my Eportfolio because it will allow me to demonstrate competency in database architecture, secure data handling, and integration between backend data sources and an interactive UI. Working with databases is a needed skill in software development, and this allows me to showcase the CRUD operations, along with authentication, connection security, role separation, and indexing. Adding in hashed credentials, protected routes, and a dynamic dashboard shows the ability to make systems that are usable and secure. This showcased the ability to take a simple database interaction script and make it into a system that shows off more industry standards.

During my initial planning for the enhancement I wanted to demonstrate my ability to design effective data management solutions, add security, and add cloud technologies into an existing project. I was able to meet all the outcomes planned. Migrating it to MongoDB Atlas shows the ability to take it to cloud based infrastructure. The authentication, indexing, and JSON parsing shows I have a security mindset, and am focused on industry standards in database development. This is in line with the course outcomes that ask us to build secure computing solutions and improve software functionality. I did not have to make major adjustments to my plan because the improvements aligned with course outcomes and were achievable.

While completing this project I did learn about the complexity of integrating security and performance into an existing codebase. Something I found interesting was how sensitive the database system can be when handling user input and connection credentials, especially when moving it to a cloud environment. It was also interesting to see how indexing and query structure impact overall performance and how requiring a login before running a query can reinforce defense in depth. It was challenging to restructure the dash application to incorporate authentication and ensure that users could not see sensitive data or execute queries. Through enhancing this project, I strengthened the

understanding I had of cloud deployment, secure database access patterns, and how important validating and protecting real world data operations is.