**Milestone Four**

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**Databases**

The artifact was the Contact portion of the Mobile Application project from the CS 320: Software Testing, Automation, and Quality Assurance class. The assignment was never supposed to be an application, but loosely resembled three, almost identical, applications that allow users to perform, in memory, CRUD operations on contacts, tasks, and appointments. The purpose of the assignment was to learn unit testing. The Task portion was created January 1st, 2021. I selected this item because it showcased my skills and abilities to implement fundamental programming concepts like CRUD, unit testing, thorough exception handling, and data structures. The artifact was improved by swapping out the in-memory data structure with a MySQL database. I also used advanced MySQL concepts like NLP, indexing, and sorting. I used NLP to select contacts by parts of their first name, last name, or both. I indexed the variables so they would be stored in a binary search tree structure where they could be searched for logarithmically. In a different method that displays all contacts, they display alphabetically by name in ascending order, making it easier for the user look through. The artifact enhancement ultimately improves the artifact by allowing the mobile application to work across time by saving data in a cloud from previous uses.

I met course outcomes such as using well founded techniques like NLP and indexing to improve the efficiency and user friendliness of the program. I also used well founded tools such as the Java Database Connector driver, the Eclipse IDE, and the MySQL command line terminal. I used best practices such as thorough comments, consistent naming conventions, and code structure. The program is also secure using a password protected database and catches exceptions to user input. I met all of the course objectives I had planned in Milestone One. I got the database connected to the application and added NLP, indexes, and sorted output. I can’t think of any updates I could add. I was going for the enhancement of using complex MySQL techniques. However, everything I saw online that articles classified as advanced techniques, were relatively simple to implement. However, they did add a lot of value. I also enhanced it with a database as the initial program only stored data in an in memory linked list. The biggest thing I learned in this enhancement was database data structures. I intended on enhancing it with advanced MySQL techniques, I looked at storing the data in a binary search tree like I did in Milestone three using nested tables or adjacency lists. However, I learned indexing stores data in binary search trees so all my effort in adding complexity would add no value to the program. I also learned adjacency lists do add value, but only to rectangle trees for determining proximity between 3D locations. My biggest challenge was in the planning phase looking for advanced techniques like NLP and sorting data, although they were easy to implement.