**4-2 Milestone Three: Enhancement Two: Algorithms and Data Structure**

Mohamed Saleh

Southern New Hampshire University

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Prof. Wasim Alim

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The first artifact is Pet Shelter, pet shelter project was created during Full-Stack course. I have selected this project because there are a room of enhancements that could add value for po

During this week I have worked on updating both projects’ algorithms and data structure area. For Pet Shelter web application, I revamped the entire code base, replacing old MongoDB dependencies with MySQL database and replacing all functionalities with new ones. It was quite challenging. The first challenge was the dependence on Jupyter Notebook, due to old dependencies I had to get rid of it and move the implementation to raw python files. After I successfully was able to run the project without Jupyter Notebook. I noticed a lot of broken parts, starting with image, map and other...etc. I notice that controls ids were not unique and that’s created an issue for the browser to parse the component property. I resolved these issues and then, I cut out many parts to separate class for modularity and readability. I added another dropdown list for search, replaced radio options with checklist. I started wiring all controls and callback functions with new user inputs. I developed a new function to fetch user selections in dictionary in key-value pairs and then generate a SQL statement accordingly. As I used SQL Server for most part of my career, I never had to warp SQL statement in brackets, however for MySQL I had to so I created a list of expected SQL statements and depends on the length I alter SQL statements with brackets and union keyword to make sure the result set is correct and represent user’s selection.

The second artifact I work on is the mobile app. The intended change was to convert the app from working on a single device to real-time in terms of items data updates and user authentication. I have added Firebase Authentication using google console, allowed username and password authentication method. Added firebase Firestore database for real-time interactions.