**Milestone Three**

Lesley Potts-Langdon

Southern New Hampshire University

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Dr. Satish Penmatsa

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For the data structures and algorithms portion I selected to continued to work with the applications from CS260 – Data Structures and Algorithms. Having already combined the four applications into one, I proceeded to reconfigure them to use each one to search by a different field.

There were two stages to this portion of the project. First was deciding which structure I would use for each search field. Two search fields are numeric and two are strings. I opted to keep the hash table as it was, using it to search by ID since it is the only field guaranteed to be unique. There were changes that needed to be made in the other three besides simply changing the search method. The remove method was deleted from each file since we can’t remove by a non-unique identifier. In the search method I had to handle returning multiple search results. For the vector and binary search tree I simply displayed each match as it was found. For the linked list I created a new linked list to feed the search results into and output that data after the search was complete. The intention was to utilize different methods, not necessarily to use the most efficient ones.

I did meet my objectives of using each data structure to search by a different field. I would have liked to work on a fix for being able to remove a bid from each. I would like to try to work on that a bit before final submission of the project. I think it would require feeding search results into a new structure sorted by bid Id to then be able to remove the bid.

D. Reflect on the process of enhancing and/or modifying the artifact. What did you learn as you were creating it and improving it? What challenges did you face?

The most important part of my approach was to handle one file at a time from start to finish. I started with the vector. When I had that file modified to search by title and I tested it completely I committed those changes to github and moved on to the next. Using github efficiently was another focus of milestone three. There were a couple of times I was glad that I could look back at previous versions of code that had been modified. I did get stuck while working on the linked list modifications. The data file has two different funds, Enterprise and General Fund. The logic I implemented had no problem identifying all the bids in the Enterprise fund but when I searched for General Fund it output the main menu in an infinite loop. I tried debugging but I couldn’t seem to get where I needed to go. I know that I need to spend some time on eclipse debugging and get better at using it. Since I couldn’t use the debugger, I need to take a deep dive into each line of code surrounding the problem area to figure it out. I was convinced that the problem had to do with the whitespace between the two word in the name of the fund. I made up new fund names, some with one word, some with two and some with an underscore between two words. The only instances where I hit the bug were two-word names. I have not used much C++ in the last several terms and some of the details that were likely once so obvious I need to do a little research on. I did not remember the cin reads whitespace as a terminating character. In the end I utilized getline() in conjunction with cin.ignore() and got the logic to function properly. Going through the process of finding the solution is incredibly valuable as I will now remember the solution the next time I need it.