

## Milestone Three Narrative

### 1. Briefly describe the artifact. What is it? When was it created?

The artifact selected for the data structures and algorithms portion of the ePortfolio is the binary search tree speed tester application created as the final project (using a provided CSV parser file) of my data structures and algorithms course, originally created in 2021. The application was created to test the speed of a binary search tree implementation as it read and deleted data entries obtained from a csv file.

### 2. Justify the inclusion of the artifact in your ePortfolio. Why did you select this item? What specific components of the artifact showcase your skills and abilities in algorithms and data structures? How was the artifact improved?

This artifact was chosen as it and its possible modifications were able to show off the ability to construct and use complex data structures, and given its primary purpose of testing speed, it would be the perfect artifact to extend to a wider variety of speed tester. Additionally, as I was unable to finish the implementation of the binary search tree in my original application, this choice served as an opportunity to prove that my understanding of data structures and algorithms has continued to advance since the ending of the data structures course.

The change into a multi-data structure comparator was accomplished through the addition of the linked list data structure, and the hash table data structure. The hash table was created with two kinds of collision resolution, chaining and linear probing. All of these data structures were implemented in their own files and were called into the main file through their headers. Additionally, the originally unimplemented remove function of the binary search tree was made functional.

With these data structures complete, the main file was modified to allow for direct speed comparisons to be made between the functions of each structure.

3. Did you meet the course objectives you planned to meet with this enhancement in Module One? Do you have any updates to your outcome-coverage plans?

The primary course objective met with this milestone was that of designing computing solutions that solve a given problem using algorithmic principles and computer science practices with a focus on their trade-offs. The creation and modification of multiple data structures and the direct speed testing of their respective functions directly reflected this objective.

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

Throughout the creation of this artifact, I was made to realize that my understanding of my chosen data structures was deeper than previously thought. Fixing the remove function from my old binary search tree implementation was far easier than anticipated, as I had remembered how much difficulty my first attempt at implementation was.

The greatest challenge I faced during this enhancement was dealing with hash table collisions. I faced many bugs while setting up collision resolution, however, once I finally succeeded in its implementation, the solutions seemed simple and intuitive.