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Report: Program 3

The purpose of Program 3 was to implement an original data structure referred to by the homework assignment as an “Addendum List”. This data structure consists of two tiers of arrays. The first tier references the second tier. Items that are to be added are not necessarily inserted into the original array, but into another array at an incremented index. For this program, the method to locate the first element in a tier 2 array and the method to determine if an element exists in the data structure were implemented.

The first method was designed in a simple linear fashion. The Big O execution time of my particular implementation is O(n), for, in the worst case, it will perform a comparison on every single element. Though a modified binary search would have been more efficient, the time and effort required to write it did not outweigh the speed difference, for the number of items in the test cases was small. However, because of this implementation, there is no need to worry about duplicates. It will iterate through the tier 2 array until it finds the first element with the desired value.

The ‘contains’ method largely uses the first method. It iterates through the tier 1 array and performs the first method on each tier 2 array. If the element is located in any of the tier 2 arrays, it will return true. The Big O run time of this method is O(N). No matter the case, if there are N elements total in the data structure, it will have to scan each one to see if it is the matching element. This is true, regardless of how many elements are in each tier 2 array. At this time, there are no known bugs in either method.