Varun Garg

vxg130

Final Project: Proposal

* 1. Fiona Liu
  2. I have chosen IntArrayBag and IntLinkedBag data structure implementations from HW3, and I will modify these data structures to be sorted (ascending order) as elements are added and modify all methods (but remove addMany and union methods) inside to make sure that data remains sorted during any operation performed. Then I will analyze three methods between the two data structures: add, addAll and remove.
     1. The add method will be modified to add an element and place it in the correct location of the array. The run time analysis of this will be performed for both data structures.
     2. Analysis will be done on whether the merge sort algorithm can be used for addAll implementation in both data structures and benefits for it. This way elements (to be added from the addAll method) will be added to the data structures based on current implementation, and then the merge sort method will be called on both data structures to see the run time.
     3. Analysis will also be done on how sorted data structures of IntArrayBag and IntLinkedBag will change the run time of the remove method in both data structures.

These three characteristics will be analyzed for run time theoretically. For experimentation, both data structures will be created (with different equally spaced total elements, N) and then the three methods will be called to perform their operations, using same values to be added and removed by the three methods in question. The run times being outputted and graphed, x-axis will have the N values, and y-axis will have run times in milliseconds. The theoretical and experimental analysis will then be analyzed.

* 1. I will not use specialized code from somewhere else. Rather I will modify the code for the data structures (IntArrayBag and IntLinkedBag) from HW3 to add elements in a sorted manner. The merge sort algorithm used in HW9 will be used, with modified input for the selected data structures (remove the int array input for IntArrayBag and IntLinkedBag). Also, new method(s) will be added in IntLinkedBag to get elements based on index (this will help in the use of merge sort for the IntLinkedBag).