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EECS 233

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Final Project Proposal

I will complete this project on my own. For the project I will design and write my own data structure that will dynamically swap between three different types of data structures (array, linked list, hash table) depending on multiple parameters, such as size, frequency of swaps, frequency of addition/removal, etc. The purpose of the data structure will be to hold elements of type E. The data structure will have sort and search methods that will adapt depending on the current state of the data structure. This custom data structure will be compared to Java's native **ArrayList**, **LinkedList**, and **HashMap** classes. The custom data structure will be compared in terms of time efficiency with respect to **add in order** (maintain sorted state), **remove largest**, and **search**. The data structure will be compared for each operation for every different data structure. Then, the data structure will be compared to each built in structure while dynamically shifting between its modes of operation. The project will require Java standard libraries, for comparison purposes. Additionally, code written as part of the course may be implemented for the custom data structure.

To summarize, I will create a custom data structure that swaps between being an array, linked list, or hash table depending on how it is being used. I will compare this data structure to Java's native ArrayList, LinkedList, and HashMap classes. The operations being compared are add in order, remove largest value, and search for a value. The custom data structure will be compared in each state for each operation; for example, the custom structure in array state will be compared to ArrayList, LinkedList, and HashMap for each of the three operations. The data structure will also be compared to the three while it is allowed to dynamically shift state, presumably offering slightly worse performance than each specialized use case, but releasing the programmer from the responsibility of manually changing the data structure used.