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Data Structures (CS 261)
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Problem 2 - Comparison

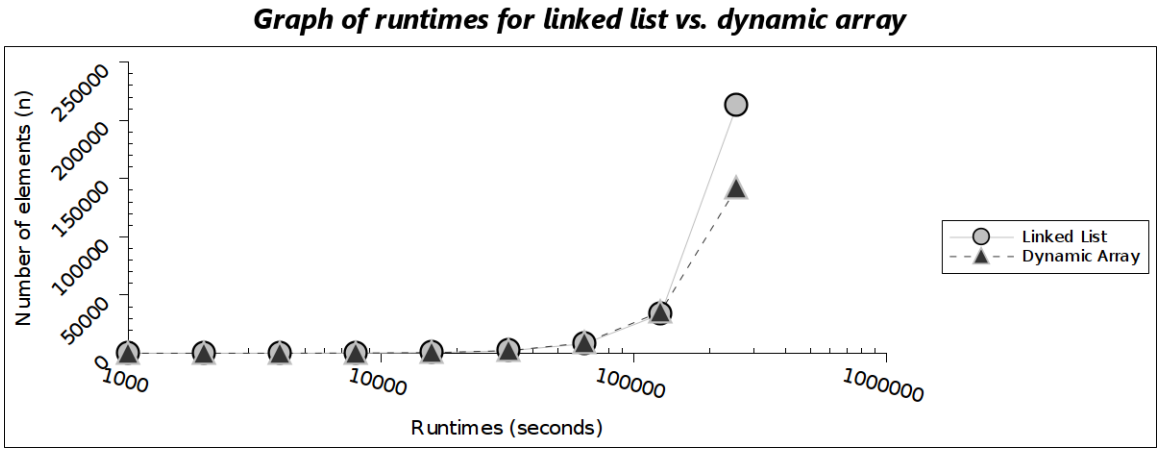

Figure 1: Graph comparison of runtimes for different data types

1 Questions

1.1 Which of the implementations is the fastest?

They appear to be both be of similar run times. Judging by the fact that they both have to iterate through the data set (the dynamic array and the linked list both have to inspect each element to determine its value), and we are merely checking the content instead of adding or removing it, the implementation difference should be small and they should both be $\mathcal{O}(n)$ for linear time operations. However, it does appear the linked list begins to take more time for larger values, although they remain fairly similar.

1.2 Would you expect anything to change if the loop performed `remove()` instead of `contains()`? If so, what?

It would have a significant impact on running time, as each element would take incrementally less time to find (both contains and remove must locate the element first), so both the linked list and dynamic array would take noticeably less time than they do currently. I would expect the linked list to take slightly less time due to the fact that the dynamic array has to resize itself during operation.