Assignment #3 – Part 2

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1. Which of the implementations uses more memory? Explain why.

The Linked List implementation uses more memory, because each link contains space for two addresses (next and previous), as well as the value. Whereas the Dynamic Array implementation simply contains a contiguous block of memory, full of data.
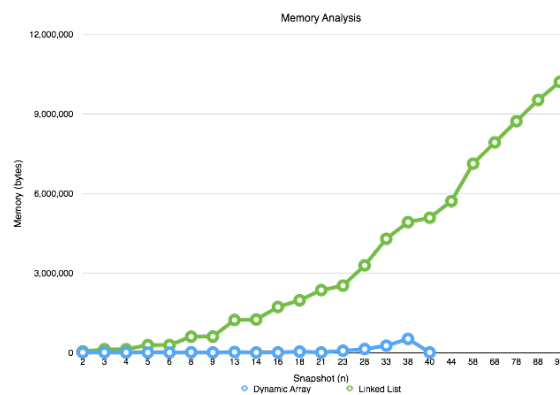

Figure 1: *Memory Allocation Comparison*

2. Which of the implementations is the fastest? Explain why.

In theory the Linked List implementation should be faster, but in practice the Dynamic Array implementation is faster. This is because the Dynamic Array implementation does fewer operations and is able to randomly access items.
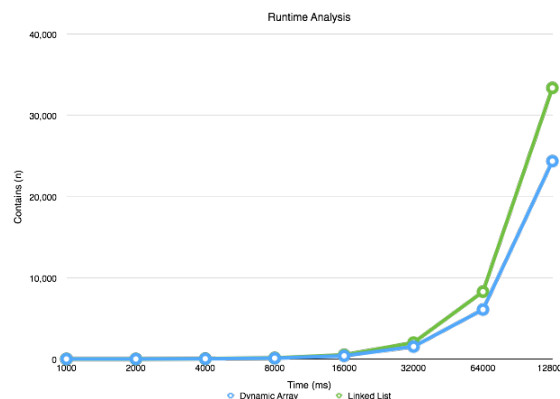

Figure 2: *Runtime Comparison*

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

If we were to change the loop to `remove()` instead of `contains()`, the Linked List would become faster, because removing an item from a Linked List can be done in O(1) time. Versus removing an item at any position except the last element of a Dynamic Array taking O(n) time – because when removing an element in any other position in the Dynamic Array requires shuffling all other items to fill the gap.