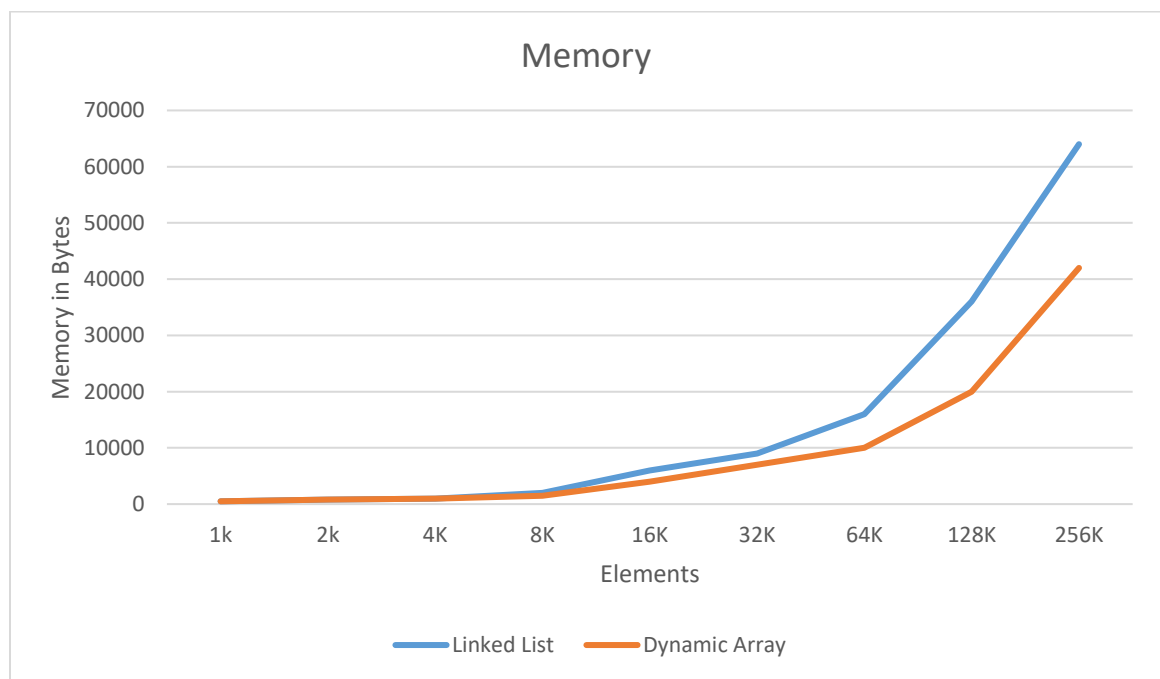David Rider

CS 261

Assignment 3

April 29, 2017

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

The linked list uses more memory. This difference is because the linked list must contain a value, along with pointers to the next and previous list node. The dynamic array only needs to contain the data, and as it is stored contiguously, so it uses less memory than the linked list implementation.

Memory

Memory in Bytes (y-axis): 0, 10000, 20000, 30000, 40000, 50000, 60000, 70000

Elements (x-axis): 1k, 2k, 4K, 8K, 16K, 32K, 64K, 128K, 256K

Legend: Linked List, Dynamic Array

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

The dynamic array is faster because it is stored contiguously. Traversing a linked list requires following a pointer to a block of memory that is not connected.

Memory
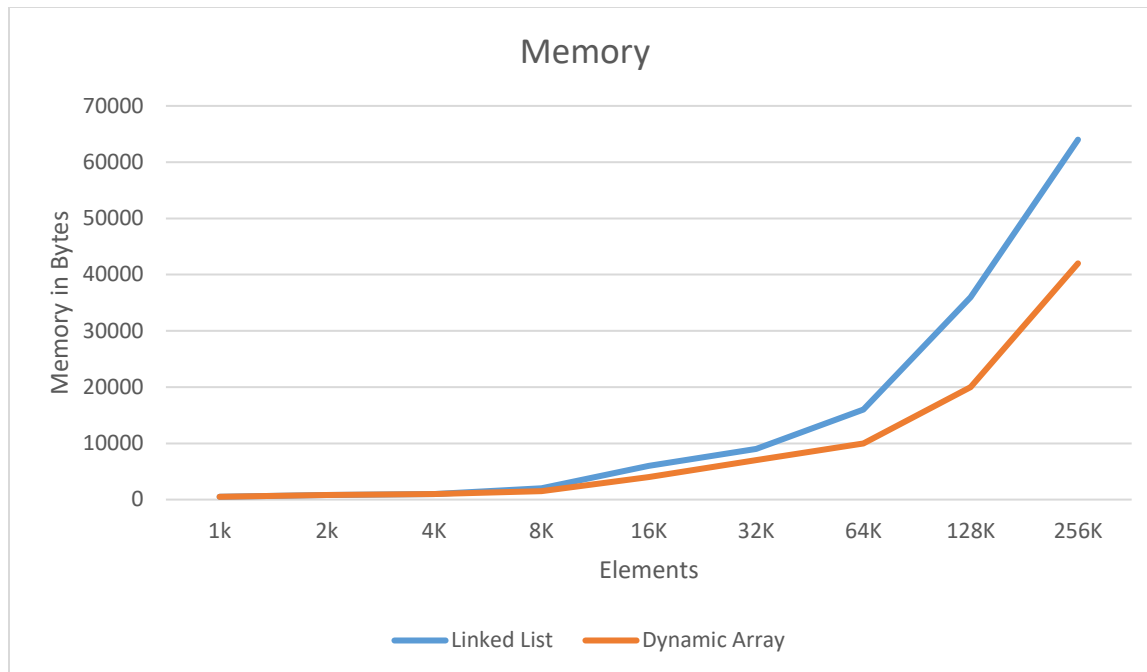
3. Would you expect anything to change if the loop performed remove() instead of contains()? If so, why?

The linked list would become faster. Removing an item in the dynamic array would require the values to be shifted, while removing an item from a linked list would simply be a matter of switching the next and previous pointers of the node to be removed to the adjacent nodes.