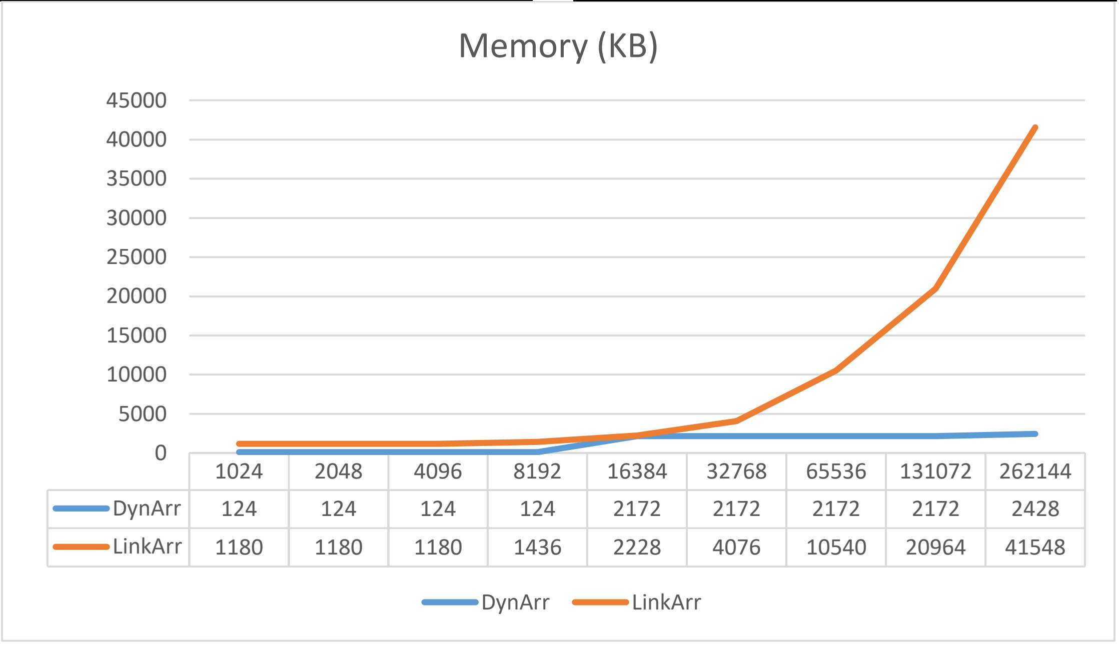
Problem 2: Linked List vs Dynamic Array performance Comparison Stephen Townsend

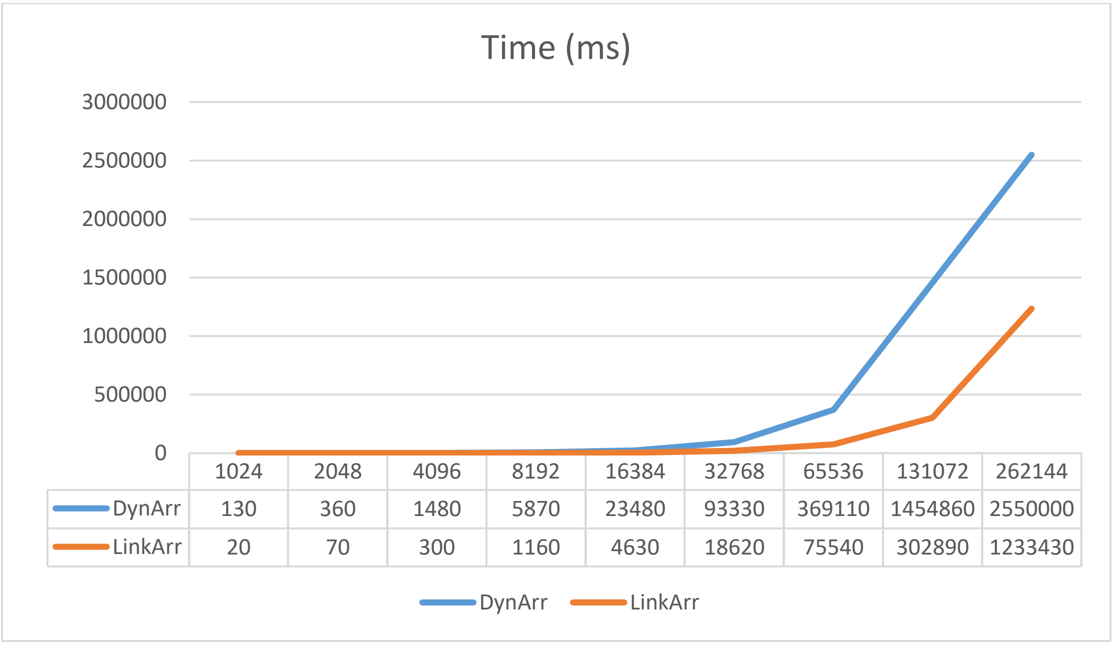
2/5/17

DynArr			
Elements		Memory	Time
1024	2^10	124kb	130ms
2048	2^11	124kb	360ms
4096	2^12	124kb	1480ms
8192	2^13	124kb	5870ms
16384	2^14	2172kb	23480ms
32768	2^15	2172kb	93330ms
65536	2^16	2172kb	369110ms
131072	2^17	2172kb	1454860ms
262144	2^18	2428kb	2550000ms

LinkArr			
Elements		Memory	Time
1024	2^10	1180kb	20ms
2048	2^11	1180kb	70ms
4096	2^12	1180kb	300ms
8192	2^13	1436kb	1160ms
16384	2^14	2228kb	4630ms
32768	2^15	4076kb	18620ms
65536	2^16	10540kb	75540ms
131072	2^17	20964kb	302890ms
262144	2^18	41548kb	1233430ms



	1024	2048	4096	8192	16384	32768	65536	131072	262144
DynArr	124	124	124	124	2172	2172	2172	2172	2428
LinkArr	1180	1180	1180	1436	2228	4076	10540	20964	41548



	1024	2048	4096	8192	16384	32768	65536	131072	262144
DynArr	130	360	1480	5870	23480	93330	369110	1454860	2550000
LinkArr	20	70	300	1160	4630	18620	75540	302890	1233430

Problem 2: Linked List vs Dynamic Array performance Comparison Stephen Townsend

2/5/17

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

From what I gathered, it looks like the Linked List uses more memory. This makes sense because each node contains more information than that of an array. Each node holds its own value and set of pointers to other nodes. The dynArr implementation is a set of memory locations that holds a single value.

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

The Linked list seemed to be faster than the Dynamic Array. Time was not much of a factor until the calculations got to 2^15. The more information the longer it started to take. I would normally think that transversing through an array would be faster, but this was not the case.

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

I would not expect anything to change. It would take the array much more time to complete the task because it would need to shift each element to make sure there are no gaps. The Linked List only needs to re-associate it pointers which is a quick process. The Array would have to run at O(n) rate.