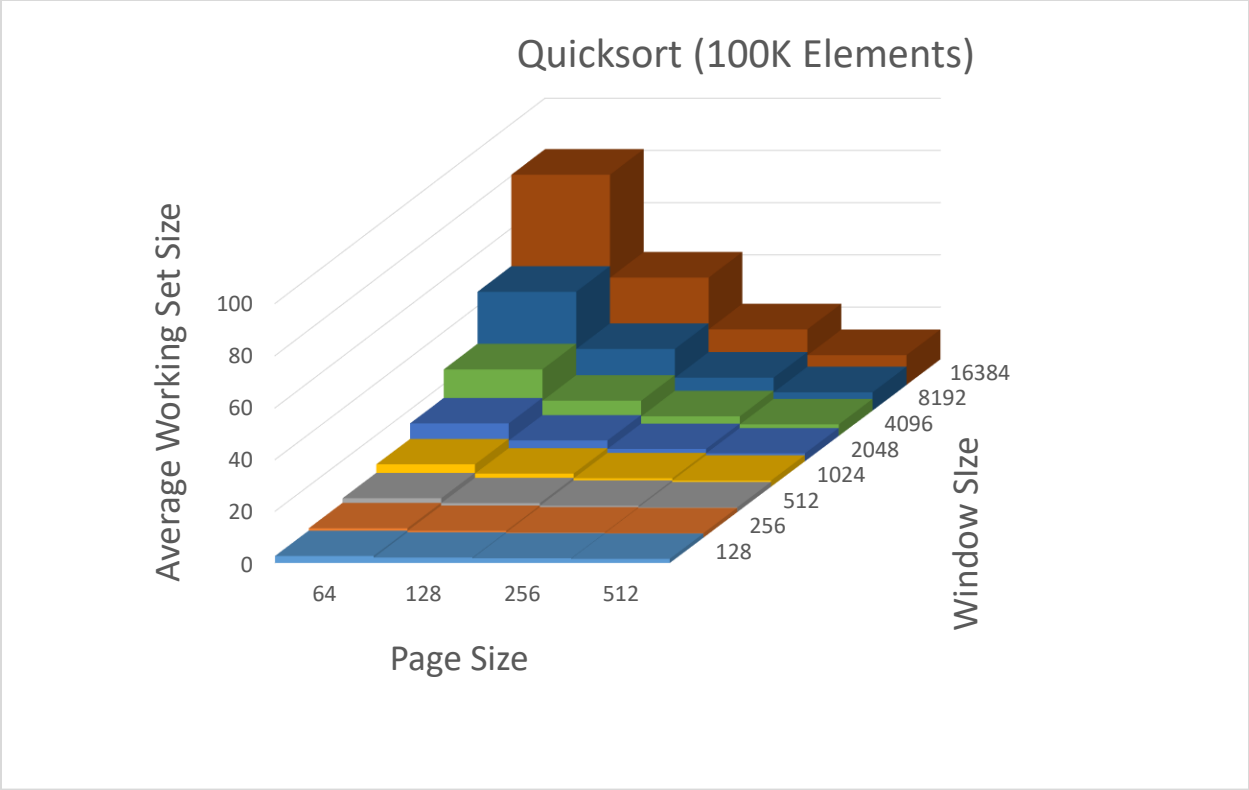


Working Set Size Report

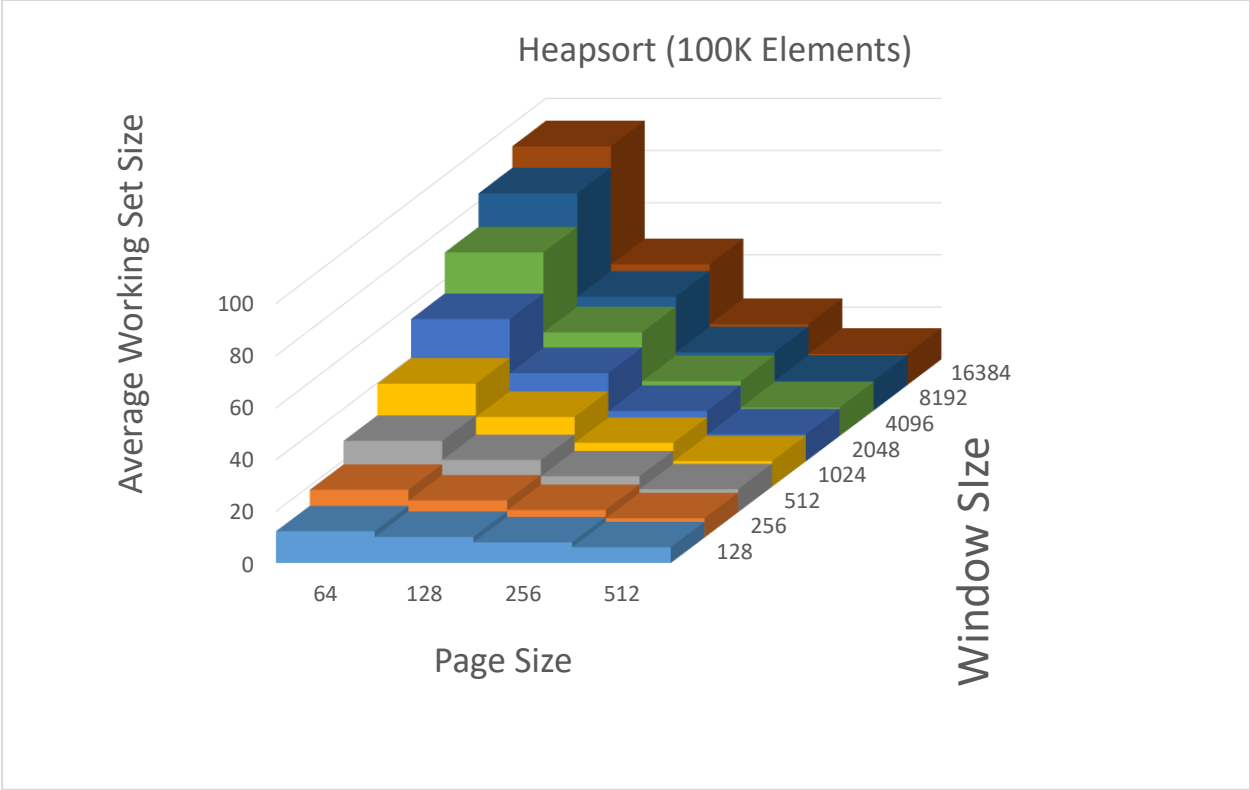
Andrew Jack

Kevin Wang

Dec 3, 2016



		Page Size			
		64	128	256	512
Window Size	128	2.7	2.1	1.8	1.6
	256	3.6	2.6	2	1.7
	512	5.4	3.5	2.5	1.9
	1024	8.7	5.1	3.3	2.4
	2048	14.7	8.1	4.8	3.1
	4096	25.6	13.6	7.6	4.5
	8192	45.5	23.6	12.6	7
	16384	80.5	41.1	21.3	11.4



		Page Size			
		64	128	256	512
Window Size	128	16.5	14.5	12.7	11.0
	256	27.1	23.3	19.8	16.6
	512	45.2	37.9	31.3	25.1
	1024	75.3	61.4	48.8	37.3
	2048	123.6	97.1	73.5	52.8
	4096	197.0	147.5	105.0	69.7
	8192	301.7	212.5	140.4	84.9
	16384	437.8	285.7	172.0	95.1

Similarities

Smaller Page Size Correlates to Larger Average Working Set Size

For both sorts, as the page size was decreased, the average working set size increased. This relationship is expected because a smaller page size means less memory addresses in a page, so more pages are necessary to represent a set of memory addresses. Therefore, the working set size will increase since more pages are used.

Greater Window Size Correlated to Larger Average Working Set Size

For both sorts, as the window size was increased, the average working set size increased. This relationship is expected because a larger window size means a larger interval of memory accesses, so more unique pages will be accessed. This translates to a larger working set size.

Differences

Average Working Set Size

When sorting the same number of elements, the quicksort had a substantially smaller average working set size compared to the heapsort. For example, for 100K elements, a page size of 128, and a window size of 128, quicksort had an average working set size of ~2 while heapsort was ~15. This difference reflects the different approach to sorting between the algorithms. Quicksort demonstrates more spatial locality since its index pointers advance sequentially during the partition stage, leading to a small working set size. However, heapsort's fix-heap operation requires traversing the whole heap, which results in memory accesses that are far apart, leading to a large working set size.

Working Set History Pattern

Quicksort's working set size remained fairly constant throughout the sort, while that of heapsort started high and dropped off at the end. This is because quicksort consistently deals with a similar size of numbers with each partition. However, heapsort starts off with a large heap, gradually decreasing its size as the minimum element is removed. Therefore, near the end, the working set is small.