Analysis: Heap vs QuickSelect Algorithm

The table below shows the QuickSelect algorithm has a smaller execute time than the heap algorithm in all cases tested, even though the time complexity for QuickSelect is n2 and the time complexity for Heap is nlogn.

|  |  |  |  |
| --- | --- | --- | --- |
| Case | Kth | Heap | QuickSelect |
| One | 10 | 34 ms | 26 ms |
| Two | 1000 | 38 ms | 15 ms |
| Average | - | 36 ms | 20.5 ms |

QuickSelect uses the partition function where the index of the pivot is n-k-1, which will be the kth largest number and this produces the average time complexity for QuickSelect algorithm which is n. The average time complexity of the Heap algorithm does not change from nlogn. Therefore, QuickSelect has a better execution time the bigger the k value is.