Sorting Algorithms

By Group 14

Insertion Sort

Insertion sort is a quite simple sorting algorithm and most effective on short lists and arrays with a maximum of 20 elements. It iterates through the list one item at a time, so it would be very ineffective for longer arrays. Insertion sort can also be helpful to use when the input array is almost sorted and only has a few items left to sort.

Quick Sort

Quick sort is a divide and conquer algorithm, the other two are not. Quick sort has the fastest average-case runtime of the three algorithms, however the worst-case runtime is O(n^2). Thus, quick sort is preferable to Heapsort in most cases, although not when there is a high risk of a worst-case scenario.

Heap Sort

Heap sort is typically slower than quicksort on average, but unlike quick sort it does not require massive recursion or multiple arrays to work. Heap sort has a constant running time of O(nlog(n)), which means it has a better worst-case runtime than quicksort. Heapsort also works in a way that makes it very useful when we want to find the smallest or the highest value of an array directly. Since heap sort operates equally in all cases, it is also good to use in systems where the running time is critical.