Algorithms and Data Structures I
Assignment 2 - Group 44

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Comparison of sorting algorithms

Algorithm	Worst-Case	Average-Case	Best-Case
Insertion Sort	$\Theta(n^2)$	$\Theta(n^2)$	$\Theta(n)$
Quicksort	$\Theta(n^2)$	$\Theta(n\log(n))$	$\Theta(n\log(n))$
Heapsort	$\mathcal{O}(n\log(n))$	$\mathcal{O}(n\log(n))$	$\mathcal{O}(n\log(n))$

Advantages of using insertion sort over quicksort and heapsort algorithm:

- Insertion sort has the simplest sorting algorithm implementation over quicksort and heapsort. As a result, quicksort is preferable for small amount of data since the constant factors affects the time efficiency far more in that case than for large amount of data.
- Insertion sort has the lowest asymptotic growth at the best case.

Advantage of using quicksort over insertion sort and heapsort algorithm:

- Quicksort and heapsort algorithms have the same asymptotic growth in the average and best case, but heapsort algorithm needs more read/write operations in memory than the quicksort in general. Read/write operations damage the time performance of heapsort and as a consequence quicksort is faster at the average case.

Advantage of using heapsort over insertion sort and quicksort algorithm:

- Heapsort sorting algorithm has the lowest asymtotic growth at the worst case.