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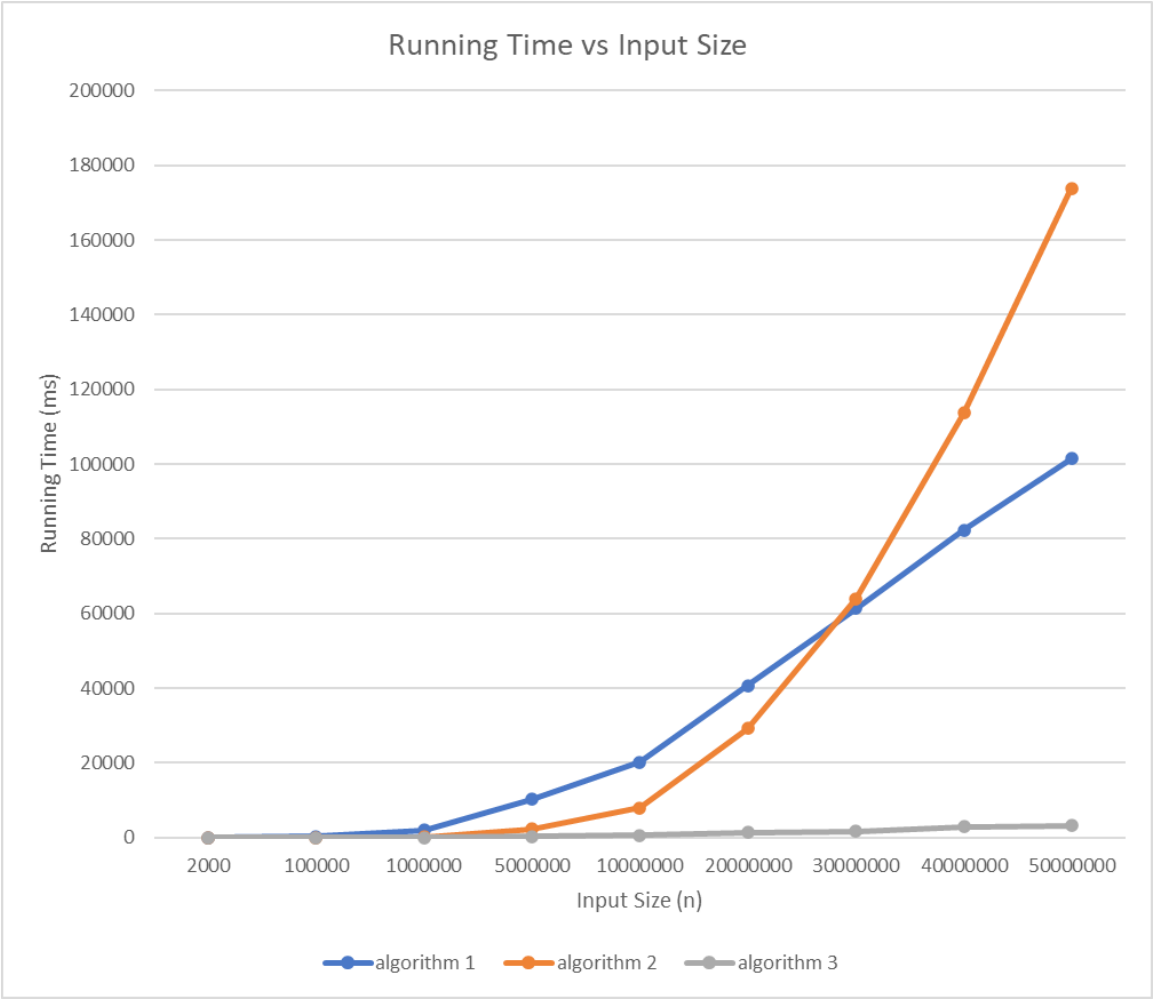
CS201 - HOMEWORK 2



The specications of the computer that is used to obtain these execution times:

Processor: Inter(R) Core(TM) i7-8565U CPU @ 1.80GHz 1.99 GHz

Ram: 16,0 GB

Operating system: Windows10

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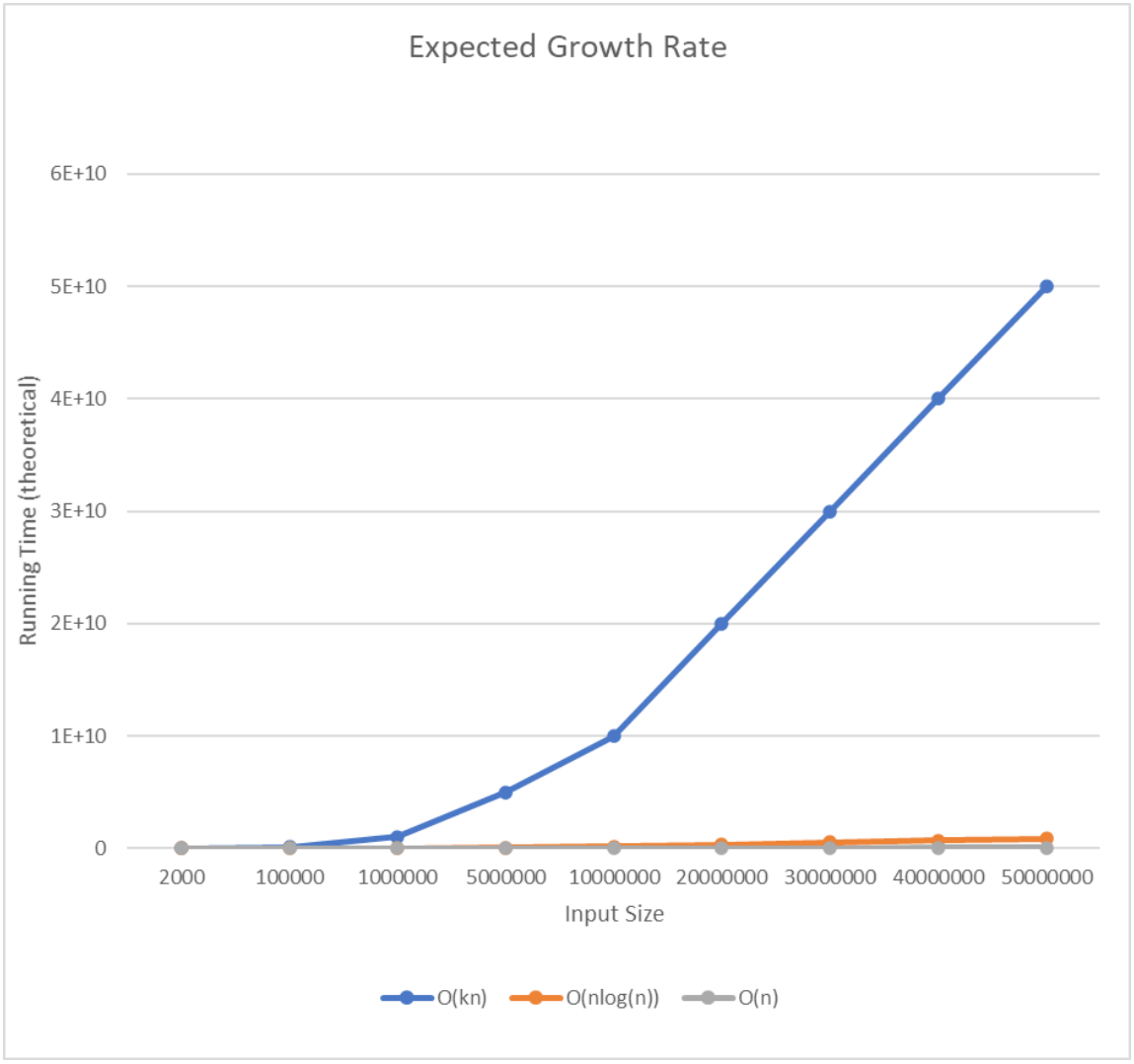
Expected growth rates obtained from the theoretical analysis



In the first and third algorithms, the growth rate obtained from the nine different input sizes are similar to the expected growth rates which are O(kn) and O(n) respectively. In contrast, the results of the second algorithm show different growth rate compared to expected rate which is O(nlog(n)). First algorithm produces small scale values compared to expected ones, so the growth rate is slightly lesser than theoretical. The reason can be the effect of the k parameter. In the second algorithm Quicksort is used and when the input size n is much greater than the k value, Quicksort takes too much time and it becomes inefficient. Because algorithm 2 sorts whole array before taking the first k largest numbers. Therefore, expected growth rate and results don't match when the input size n increases dramatically. Third algorithm met all expectations as it always be the most efficient way of sorting since it is a linear time algoritm for finding the k largest numbers.