BLG 335E Analysis of Algorithms I

Project I Report

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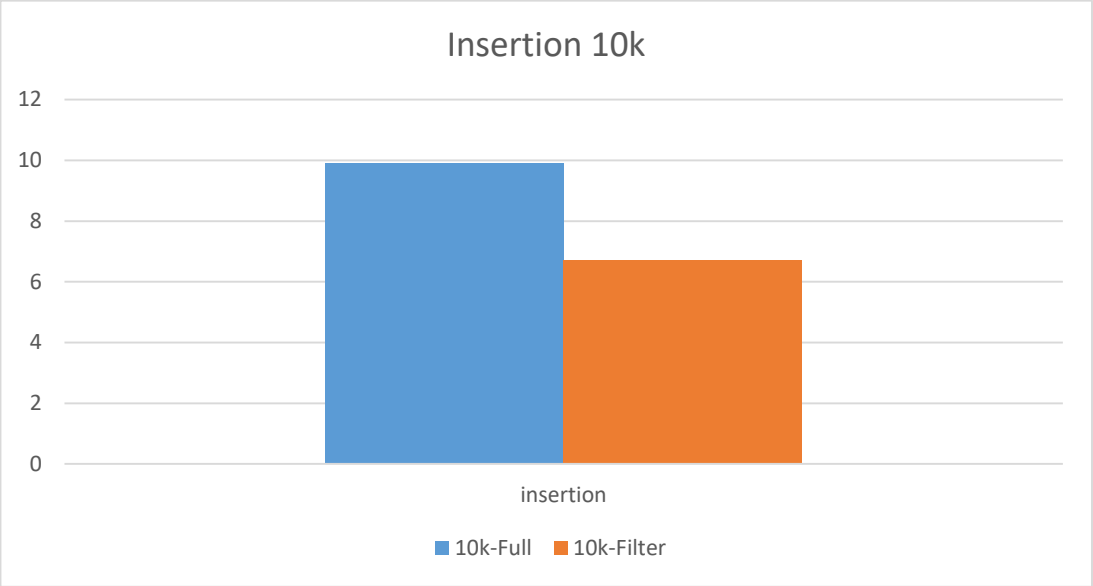
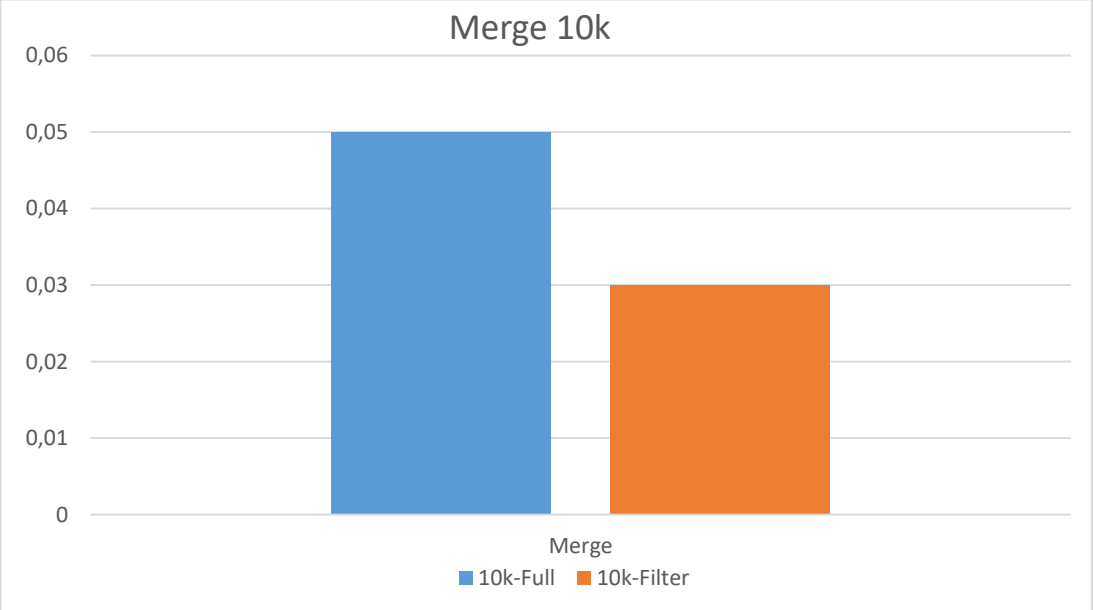
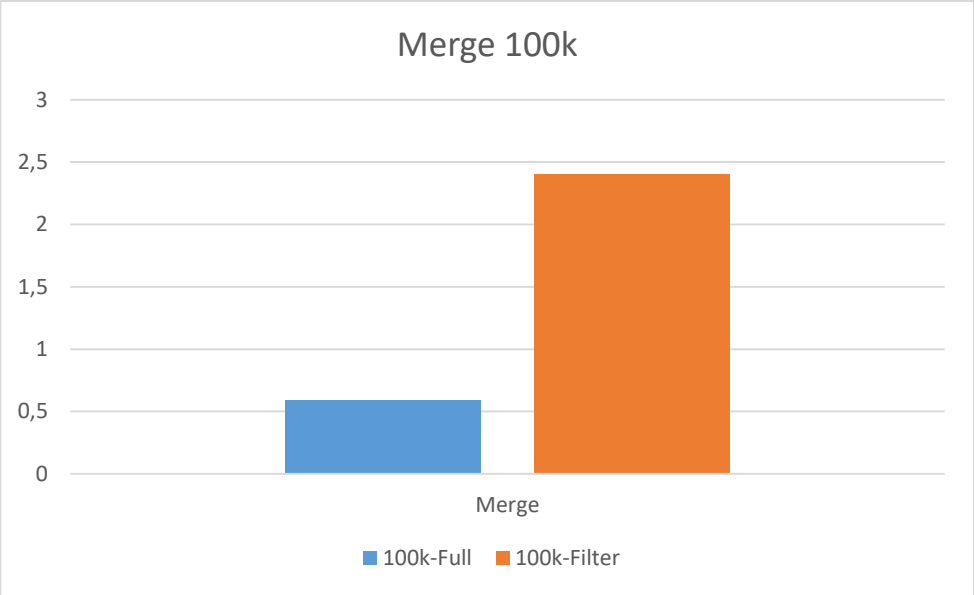
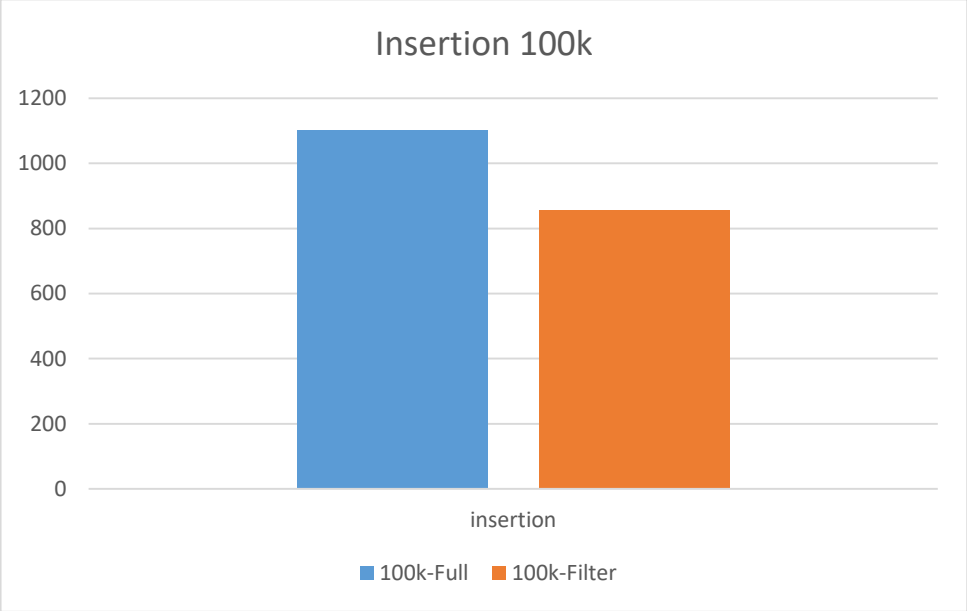
1)

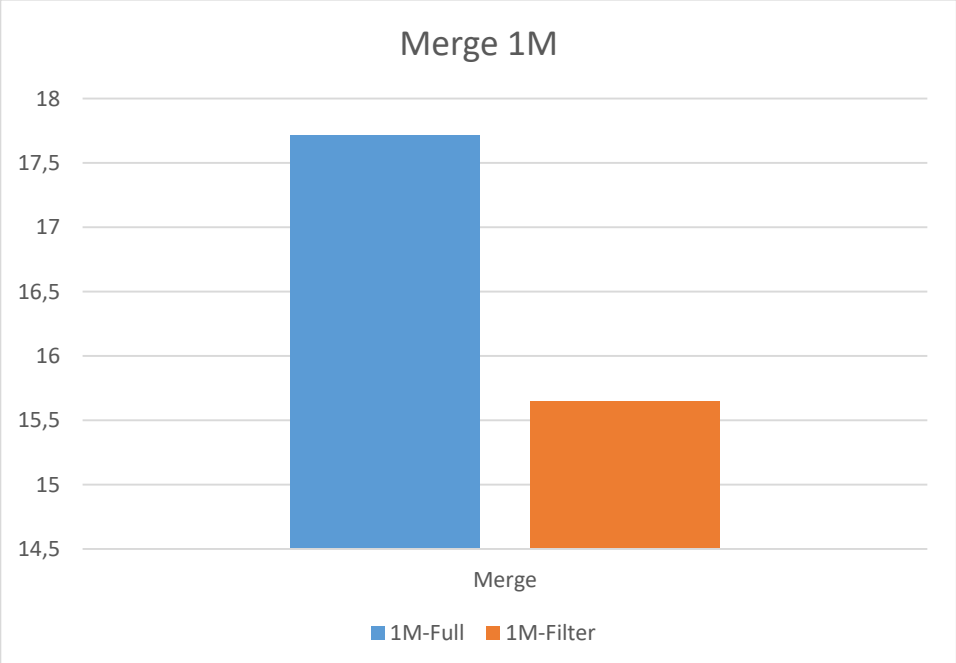
	FULL SORT			FILTER SORT		
	10k	100k	1M	10k	100k	1M
MERGE SORT	0,05	0,59	17,716	0,46	1101,37	15,649
INSERTION SORT	9,89	1101,37	?(Took Too Long)	6,7	865,42	?(Took Too Long)











(NOTE: I could not measure the sorting time of insertion sort algorithm on 1M file. Program didn’t give any errors but it took too long.)

2) Merge Sort is much faster than insertion sort. Insertion is not even close to merge sort in any scenario. The main result of that big speed difference is that two algorithms complexity. Insertion sort's complexity is On^2 and merge sort's is $Onlog_2n$. As it is seen that expressions, as the number of elements increases, difference of sorting time between two algorithms also increases exponentially.

3) In the given datasets, Name columns are generally longer than others. And also there are some different names which contain same word(s) (Ancient of Lore & Ancient of War). It affects comparison time of those strings. Because when comparing two strings,compiler substracts char value(ASCII) of second string's from first string's char value which is on same index. So, if there are 2 strings containing same characters in long quantities, comparising that 2 string's time can affect total sorting time naturally.

4) If two elements which are equal according to sorting rules, are also on the same order in output, that means this sorting algorithm is stable. Insertion sort and merge sort are stable algorithms. I think, in that assignment , there wouldn't any problems if algorithms would be unstable. In fullsort,there are 3 parameters used for sorting. Assume that there are 2 rows which has same COST and NAME but different CLASS. Even if we change their order when comparing according to cost and name, the final order will be based on class column. So, i think final order would not be affected by algorihms stability.