Laboratory practice No. 2:
Algorithm complexity

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3) Practice for final project defense presentation

3.1

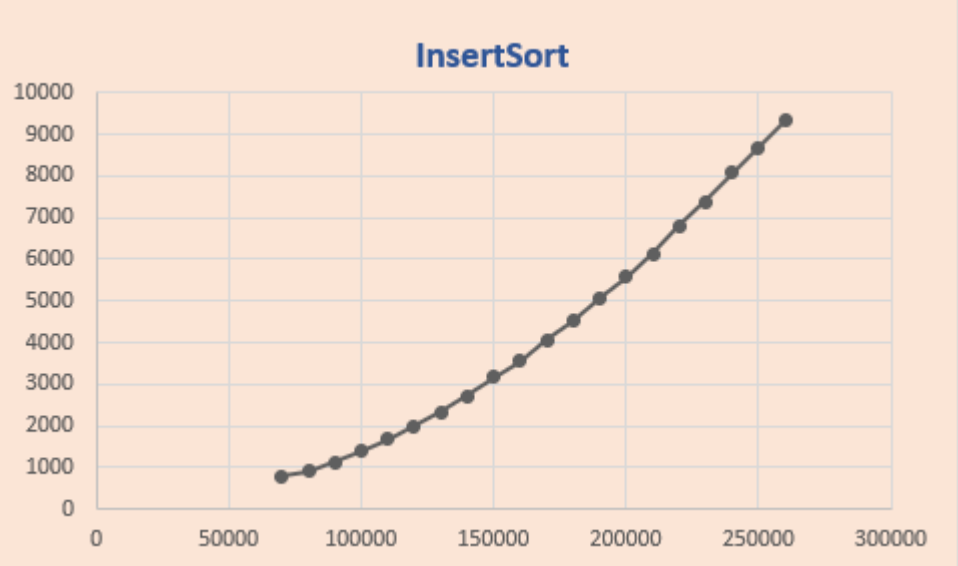
Length of the array (n)	Time T(n)
70000	774
80000	913
90000	1115
100000	1396
110000	1670
120000	1996
130000	2330
140000	2717
150000	3172
160000	3567
170000	4073
180000	4529
190000	5079
200000	5583
210000	6128
220000	6811
230000	7388
240000	8089
250000	8687
260000	9343

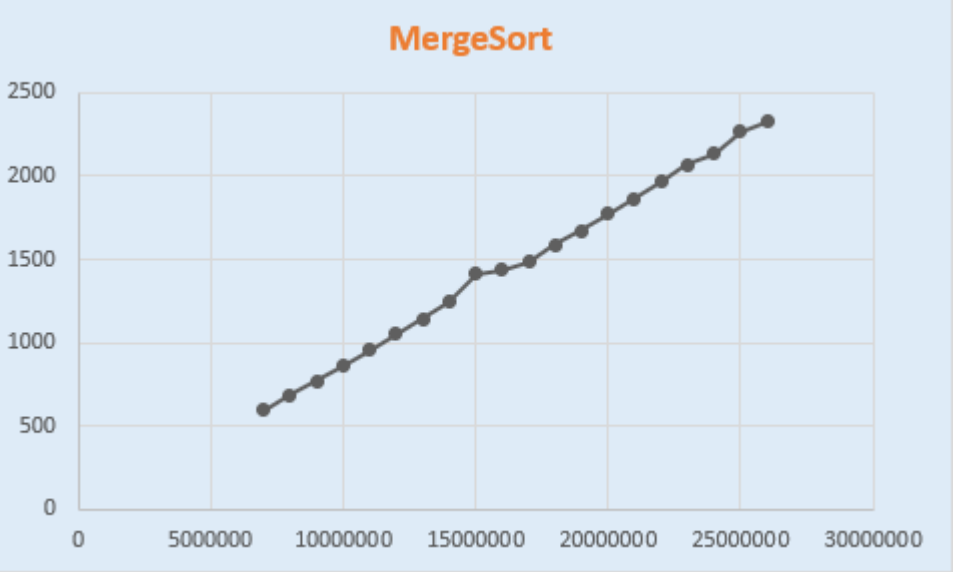
insertionSort

Length of the array (n)	Time T(n)
7000000	593
8000000	683
9000000	770
10000000	861
11000000	958
12000000	1052
13000000	1140
14000000	1242
15000000	1410
16000000	1436
17000000	1487
18000000	1589
19000000	1673
20000000	1772
21000000	1867
22000000	1969
23000000	2070
24000000	2136
25000000	2265
26000000	2329

mergeSort

3.2





3.3 It would not be the best to use in a video game with millions of elements in a scene and real-time demands in rendering 3D scenes. Although in small data it can be efficient, in larger amounts of data it would be quite slow due to its complexity of O(n^2).

3.4 In the worst case, the mergeSort algorithm has a complexity of O(nLog (n)), due to the constant separation of the array to be able to traverse through it.

3.4[Optional] This algorithm works in this way: Given a number array, it searches the largest span between two equals numbers, looking the farthest position to the left and the farthest to the right of the number.

3.5[Optional] To make insertion sort faster than merge sort while working with big arrays, all the data or numbers must be the same.

3.5

Array2:

BigDiff: O(n).

CountEvens: O(n).

Evenodd: O(n).

IsEverywhere: O(n).

More4: O(n).

Array3:

CanBalance: O(n^2).

Fix34: O(n^2).

Fix45: O(n^2).

SeriesUp: O(n^2).

MaxSpan: O(n^2).

3.6

Array2:

BigDiff: the "n" represents the array length.

CountEvens: the "n" represents the array length.

Evenodd: the "n" represents the array length.

IsEverywhere: the "n" represents the array length.

More4: the "n" represents the array length.

Array3:

CanBalance: the "n" represents the array length.

Fix34: the "n" represents the array length.

Fix45: the "n" represents the array length.

SeriesUp: the “n” represents the input.

MaxSpan: the "n" represents the array length.

4) Practice for midterms

4.1 *The time it takes to work the 10 thousand data will be 0.1 seconds since if 100 data take 1ms = 0.001s then the 10 thousand will take 0.1s.*

4.2 *D*

4.3 *A*

4.4 -

4.5 *D, A*

4.6 *C*

4.7 3

4.8 *A*

4.9 *C*

4.10 *C*

4.11 *C*

4.12 *A*