ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory No.2
Algorithm complexity

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3) Simulacrum questions to sustenance projects

3.1

MergeSort	
n	T(n)
7000000	1258
8000000	1090
9000000	1085
10000000	1259
11000000	1473
12000000	1542
13000000	1714
14000000	1837
15000000	1957
16000000	2065
17000000	2342
18000000	2291
19000000	2739
20000000	3018

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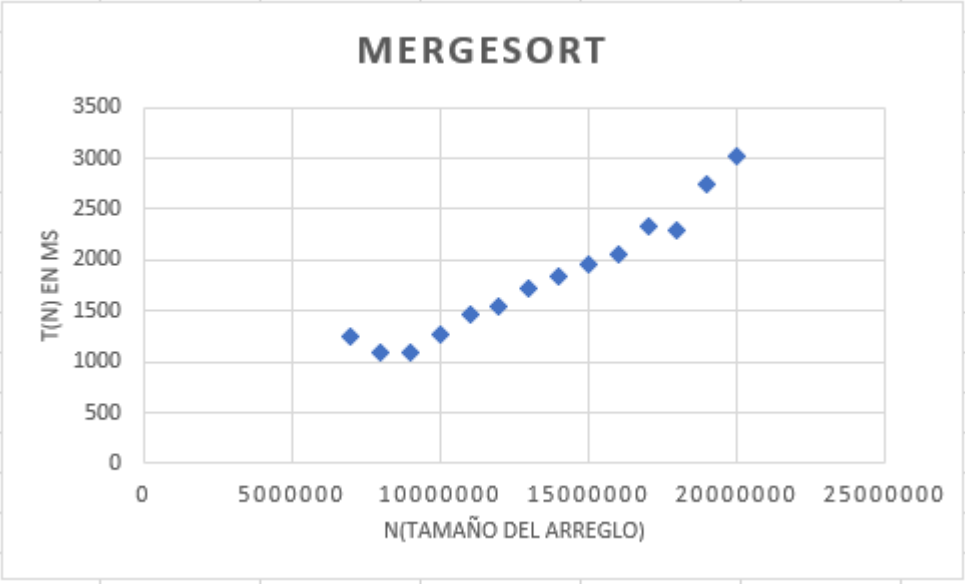
InsertionSort	
n	T(n)
50000	512
60000	898
70000	1104
80000	1233
90000	1817
100000	1851
110000	2312
120000	2669
130000	3378
140000	3290
150000	4284
160000	5003
170000	5621
180000	6065
190000	6338
200000	7576

3.2



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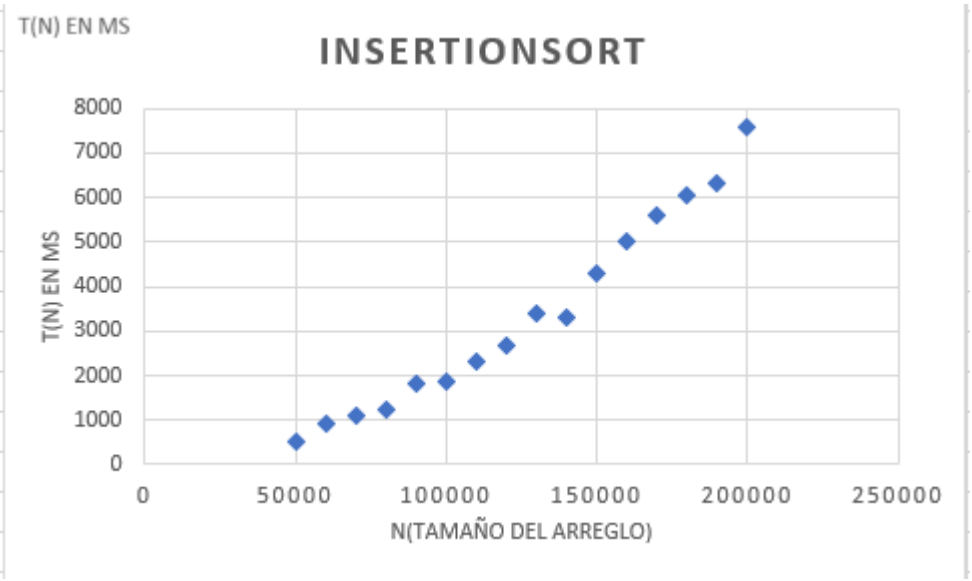

3.3 It is not recommended for rendering 3D scenes in video games because due to its complexity O (n ^ 2), as it has data from millions of elements, this algorithm will take a long time to execute, causing the user to become uninterested in the video game. He would have to wait a long time to start playing and this would cause unimaginable losses.

3.4

3.4.1 Asymptotic complexity

This complexity appears in the Merge Sort algorithm since it is charge of dividing the matrix and traversing it and this take less time than traversing the matrix and sorting one by one making its complexity O (n * (log (n)).

3.4.2 MaxSpan explanation

There is a certain matrix of numbers, we seek to find the largest interval in which two equal numbers are found, taking into account the position furthest to the left and the position furthest to the right in which it is found and returning the total number of items this interval has found.

3.5

If you want insertion sort to be faster than merge sort for large data, then this data must be sorted and must be the same. This will make the method much faster because the data is already in order and you will not have to sort it again.

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3.5.1

Array 2:

- Sum28: O(n)
- more14: O(n)
- only14: O(n)
- has12: O(n)
- has22: O(n)

Array 3:

- CanBalance: O(n^2)
- SeriesUp: O(n^2)
- Maxspan: O(n^2)
- SquareUp: O(n^2)
- LinearIn: O(n*m)

3.6

- Sum28: The n represents the array.
- more14: The n represents the size of the array.
- only14: The n represents the size of the array.
- has12: The n represents the array.
- has22: The n represents the array.
- CanBalance: The n represents the size of the array.
- SeriesUp: The n represents a variable entered for the series.
- Maxspan: The n represents the size of the array.
- SquareUp: The n represents a variable entered for the series.
- LinearIn: The n and m represent elements of the array.

4) Simulacrum of Partial

4.1 The algorithm takes 100 milliseconds that equals 0.1 seconds.
4.2 D.
4.3 A.
4.4.1 O(n*m).
4.4.2 O(n*m).
4.5.1 D.
4.5.2 A.
4.6 C.
4.7. 1,3,4.
4.8 A.
4.9 C.
4.10 C.
4.11 C.
4.12 A.

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