ESTRUCTURA DE DATOS 1
Código ST0245

Laboratory practice No. 2

Alejandro Mc Ewen
Universidad Eafit

Medellín, Colombia

amce@eafit.edu.co

Felipe Henao
Universidad Eafit

Medellín, Colombia

fhenaog3@eafit.edu.co

3) **Practice for final project defense presentation**

3.1

Insertion sort

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and
Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
Phone: (+57) (4) 261 95 00 Ext. 9473

Inspira Crea Transforma

Vigilada Mineducación   www.eafit.edu.co

ESTRUCTURA DE DATOS 1
Código ST0245

N(Tamaño de arrelgo)	Tiempo(s)
1000	0.00050902
2000	0.14225197
3000	0.42078066
4000	0.81160092
5000	1.39329195
6000	2.00273204
7000	3.01006508
8000	4.02561188
9000	5.04853821
10000	6.22421026
11000	7.64148021
12000	8.95125294
13000	10.501667
14000	12.4979219
15000	14.2805021
16000	16.4005678
17000	18.69661
18000	20.918159
19000	23.555793
20000	25.8610439
21000	28.5208812

Merge sort

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
Phone: (+57) (4) 261 95 00 Ext. 9473

Inspira Crea Transforma

Vigilada Mineducación   www.eafit.edu.co

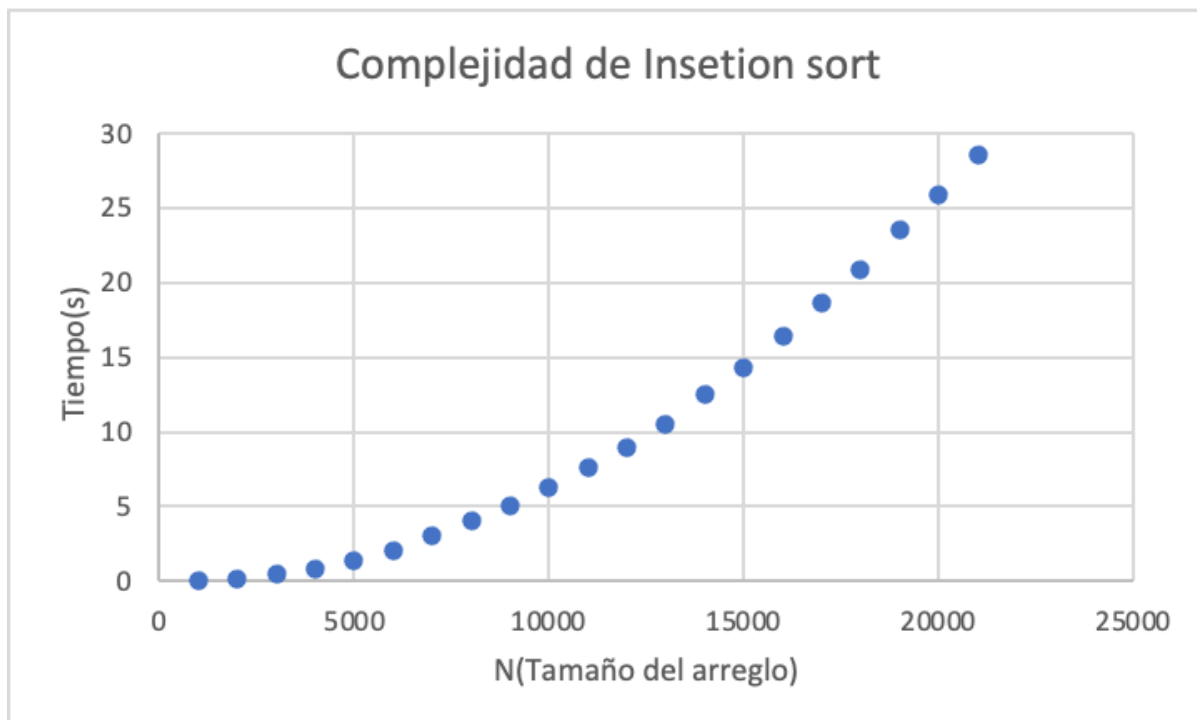| N(Tamaño de arrelgo)	Tiempo(s)
10000	0.03419471
20000	0.12546277
30000	0.20953584
40000	0.33644223
50000	0.50633502
60000	0.53390503
70000	0.65900207
80000	0.88382101
90000	1.16653919
100000	1.44512987
110000	1.63307595
120000	1.64659619
130000	1.64779592
140000	1.9630971
150000	2.37265086
160000	2.82394218
170000	3.24085093
180000	3.71030521
190000	4.16845083
200000	4.44211078
210000	4.52151203

3.2

Insertion sort

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
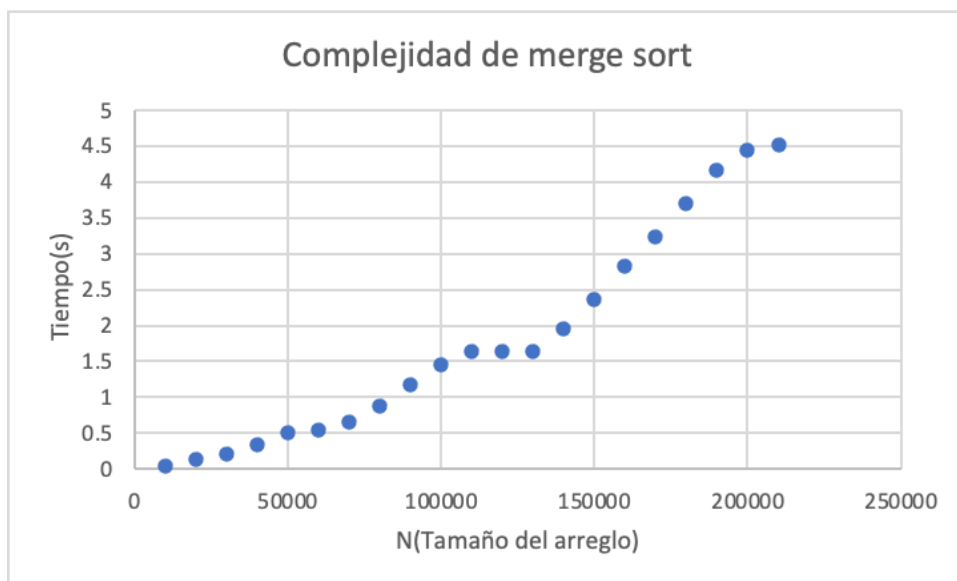**Phone: (+57) (4) 261 95 00** Ext. 9473

Complejidad de Insetion sort

Merge sort

Complejidad de merge sort

3.3 No because insertion sort complexity is $O(n^2)$ that with millions of inputs would take minutes to sort the array instead of the milliseconds people expect that a scene would be rendered.

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
Phone: (+57) (4) 261 95 00 Ext. 9473

UNIVERSIDAD EAFIT®

Acreditación Institucional
Renovación
2018 - 2026
Resolución MEN 2158 de 2018

3.4 A logarithm appears in the complexity of the merge sort because each time the size of the array is divided by two.

3.5 The data for that merge sort is greater than insertion sort is that the data in the array is order because then it only takes insertion sort O(n) time while for merge sort it takes O(n*log(n)) time. This happens because insertion sort only checks once the whole array because it is already sorted while insertion sort has to break apart the array and put it back together that takes O(n*log(n))

3.6/3.7

Array 2

Post4: O(n) n = size of the array

Only14: O(n) n = size of the array

HaveThree: O(n) n = size of the array

TwoTwo: O(n) n = size of the array

Sum28: O(n) n = size of the array

Array 3

Fix45: $O(n^2)$ n = size of the array

CanBalance: O(n) n = size of the array

LinearIn: O(n) n = size of the array

CountClumps: O(n) n = size of the array

SeriesUp: $O(n^2)$ n = size of the array

4) Practice for midterms

4.1 To process the initial input Juanito takes 0.1 seconds.

4.2 d

4.3 a

4.4 1. O(m*n)

   2. O(m*n)

4.5 1. d

   2. a

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
Phone: (+57) (4) 261 95 00 Ext. 9473

4.6 c

4.7 1, 3 and 4

4.8 a

4.9 c

4.10 c

4.11 c

4.12 a

5) Recommended reading (optional)

Mapa conceptual

6) Teamwork and gradual progress (optional)

6.1

February 28th 1 hour

March 4th 32 minutes

March 7th 30 minutes

6.2

https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab02/codigo/sorting.py

https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab02/ejercicioEnLinea/Array3.java

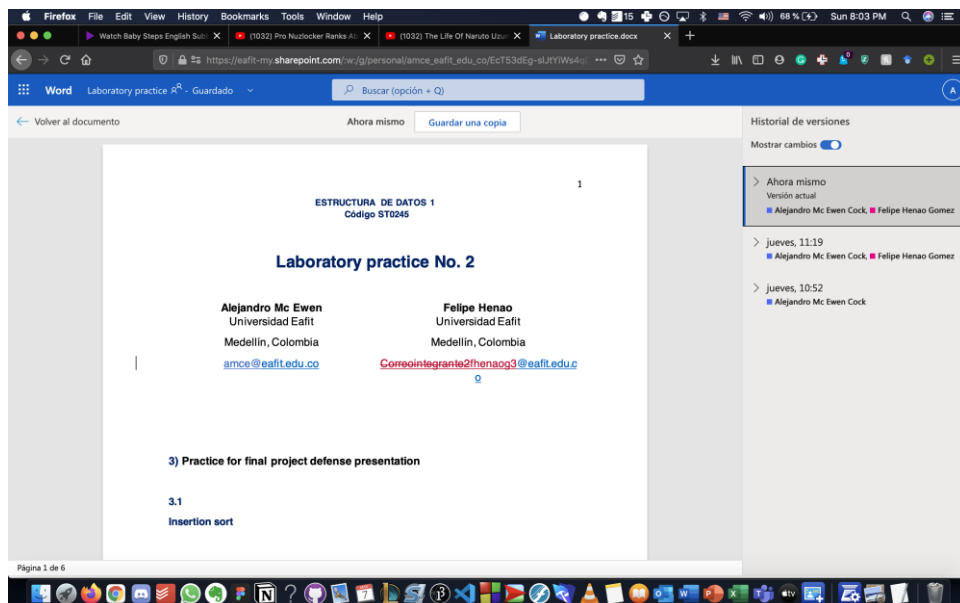*https://github.com/McEwenAle/ST0245-001/blame/master/laboratorios/lab02/ejercicioEnLinea/Array2.java*

6.3

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
Phone: (+57) (4) 261 95 00 Ext. 9473

UNIVERSIDAD EAFIT®

Acreditación
Institucional
Renovación
2018 - 2026
Resolución MEN 2158 de 2018

Inspira Crea Transforma

Vigilada Mineducación   www.eafit.edu.co

ESTRUCTURA DE DATOS 1
Código ST0245

PhD. Mauricio Toro Bermúdez
Professor | School of Engineering | Informatics and Systems

Email: mtorobe@eafit.edu.co | Office: Building 19 – 627
Phone: (+57) (4) 261 95 00 Ext. 9473