

Laboratory practice No. 4: Trees

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3) Practice for final project defense presentation

3.1

3.2 Yes, if we assign an integer to each node in the tree instead of going through the whole tree and comparing each String, we can get an $O(\log n)$. Because every time we asked, reduce $\frac{1}{2}$ the processes number.

3.3 The algorithm that we used is a binary tree search, this algorithm receives file name and then it inserts it in an array. With this array we insert the values in the tree, and we do this recursively. Then when we print the values of the tree we need to do it in post-order, so we used the post-order printing method that calls recursively too.

3.4

The methods that we use here are two, the first method is read a txt file to insert this in an array, this has the complexity of $T(n) = n+n \Rightarrow T(n) = n \Rightarrow$ and this have a O -notation of $O(n)$. The second method that we use is the insertion of the binary tree, since it is recursive and it does $T(n) = n \Rightarrow O(n)$ Operations, because it fills the tree until the last number of the array. For the printing method It is the same O -notation. So, at last it will be $O(n) + O(n) + O(n) = O(n)$

3.5

The n in our complexity analysis is the number of elements in the file that it gave us

3.6

4) Practice for midterms

4.1

- a) `int izqu = altura(node.left);`
- b) `int der = altura(node.right)`

4.2

- c) 3.

4.3

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ESTRUCTURA DE DATOS 1
Código ST0245

- a) return False;
- b) return suma == 0;
- c) a.izq, suma – a.dato;
- d) a.der, suma – a.dato;

4.4

4.4.1

- c) $T(n) = 2 \cdot T(n/2) + c$

4.4.2

- a) $O(n)$

4.4.3

d) Wilkenson, Joaquina, Eustaquia, Florinda, Eustaquio, Jovín, Sufranio, Piolina, Wilberta, Piolín, Usnavy

4.4.4

Teacher, I did not understand the options, the answer is this:

```
03 printAUX(node.left);
04 printAUX(node.right);
05 System.out.println(node.data);
```

4.5

- a) $(p.dato == toInsert \ \&\& \ p.left == null) || (p.dato == toInsert \ \&\& \ p.right == null)$
- b) $toInsert > p.dato$

4.6

- 4.6.1** d) 4

- 4.6.2** return 0;

- 4.6.3** $\text{if}(\text{raiz.hijos.size()} - 1 == 0)$

4.7.1

- 4.7.1** a) 0, 2, 1, 7, 5, 10, 13, 11, 9, 4

- 4.7.2** b) 2

- 4.7.4** d) $O(n)$

4.8 b) 2

4.9 a) 5, 3, 6, 1, 7, 4, 8, 0, 2

4.10 b) No.

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4.11.1 b) 2, 3, 4, 0, 5, 7, 6

4.11.2 a) 5

4.11.3 a) Sí

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