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Laboratory practice No. 4: Trees

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3) Practice for final project defense presentation

3.1)

Of course we can. We can implement an algorithm which is more efficient in the search and insert function. The secret is the tree needs an auto-balancing function. In that way, the complexity in the algorithm will be logarithm time.

3.2) 2.1 exercise:

In this exercise we have three classes. One of them is *Node class*, which have all the properties of the Node in our binary search Tree, like: Node.right, Node.left and its value (an integer). Another class in this package is *BinaryTree class*, which have the necessary methods to insert and to search a node in the tree. Now, the last class is *Ejercicio2_1 class*, which have two methods. The first of them is *PrePosOrden*, which, firstable, creates a Binary Tree named orden, and a boolean named temp. This method creates a Scanner variable called console too. That variable will read the values that we will insert in the console (pre order values). Then a loop will start while onto it, all the variables will be insert by the method insert in the *BinaryTree class*. The loop will be available until the user insert a character which is't a number. When the user do the last thing the boolean variable will be true and the the loop will finish. Then, the method *PrePosOrden* will call another method named *postOrden*, which will print the values of the *Binary Tree* (postOrder) in a recursive way, Firstable, we will print the left side, the the right side and finally the root.

3.3) 2.1: The complexity in the worst case is $O(n^2)$

3.4) 2.1: The “n” variable mens the total elements in the tree, that is, the number of nodes in the tree.

4) Practice for midterms

1. a) altura(raiz.izq)+1
 b) altura(raiz.der)+1
2. c

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3.
 - a) false
 - b) a.data
 - c) a.izq, suma-a.dato
 - d) a.der, suma-a.dato
4.
 - 4.1. c
 - 4.2. a
 - 4.3. d
 - 4.4. a
5.
 - a) p.left==null && p.right==null
 - b) toInsert > p.data
6.
 - 6.1. d
 - 6.2. return 0;
 - 6.3. == 0
7.
 - 7.1. 1
 - 7.2. 2
8. b
9. a
10. b

6) Team work and gradual progress (optional)

Member	Date	Done	Doing	To do
Pablo	11/10/2018 Start time: 3:40pm		construction of a family tree in java	investigate all family names to complete the tree

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Verónica	11/10/2018 Start time: 3:30pm		construction of a family tree in java	investigate all family names to complete the tree
Pablo	12/10/2018 Start time: 1:00pm	Creation of method that calculates who is the maternal grandmother of a person.		
Verónica	12/10/2018 Start time: 1:00pm	Creation of method that calculates who is the maternal grandmother of a person.		
Pablo	14/10/2018 Start time: 2:00pm	implementation of method that finds the post-order traversal of a tree	explanation of the previous method	

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Verónica	14/10/2018 Start time: 2:00pm	· solution to the partial simulation	· calculation of complexity of the method that finds the post-order · explanation of the variables of the complexity calculation	
Pablo	15/10/2018 Start time: 11:00am	· analysis of how to implement a tree more efficiently	· Compilatio n of all exercises and improveme nts	
Verónica	15/10/2018 Start time: 11:00am	· Compilation of all exercises and improvement s		