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Amazon Interview Question for Software Engineer / Developers



Construct a Cartesian tree from in order traversal



8
Answers

- anonymous 4 years ago in United States | [Report Duplicate](#) | [Flag](#)

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Country: United States

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Revision and simplified version:

```
public class CartesianTree {

    public static class Node {
        public int value;
        public Node left;
        public Node right;
    }

    public static Node build(int[] data) {
        if (data == null || data.length == 0) return null;
        return build(data, 0, data.length - 1);
    }

    private static Node build(int[] data, int start, int end) {
        if (end < start) return null;
        int min = Integer.MAX_VALUE;
        int minIndex = -1;

        for (int i = start; i <= end; i++) {
            if (data[i] < min) {
                min = data[i];
                minIndex = i;
            }
        }

        Node node = new Node();
        node.value = min;

        node.left = build(data, start, minIndex - 1);
        node.right = build(data, minIndex + 1, end);

        return node;
    }
}
```

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Both of you are right; Pseudo Code of constructing cartesian tree from sequence of nodes:

1. Find the lowest number in the sequence suppose $A[1..N]$ is the sequence of numbers and $A[i]$ is the lowest.
2. Make this $A[i]$ root of the tree.
3. Divide whole tree into two part $A[1..i-1]$ and $A[i+1..N]$
4. Apply step 1 to 3 on these two subtrees.



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```
public class CartesianTree {

    public static class Node {
        public int value;
        public Node left;
        public Node right;
    }

    public static Node build(int[] data) {
        if (data == null || data.length == 0) return null;
        return build(data, 0, data.length - 1, null, false);
    }

    private static Node build(int[] data, int start, int end, Node parent, boolean
n fromLeft) {
        if (end < start) return null;
        int min = Integer.MAX_VALUE;
        int minIndex = -1;

        for (int i = start; i <= end; i++) {
            if (data[i] < min) {
                min = data[i];
                minIndex = i;
            }
        }

        Node node = new Node();
        node.value = min;

        if (parent != null) {
            if (fromLeft) parent.left = node;
            else parent.right = node;
        }

        node.left = build(data, start, minIndex - 1, node, true);
        node.right = build(data, minIndex + 1, end, node, false);

        return node;
    }
}
```

(810)

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There is a O(n) solution to this problem. Yours is not O(n)

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```
public TreeNode build(int[] a)
{
    TreeNode root = null;
    Stack<TreeNode> stack = new Stack<TreeNode>();
    for(int i = 0; i < a.length; i++) {
        TreeNode last = null;
        while(!stack.empty() && stack.peek().val > a[i]) last
= stack.pop();

        TreeNode node = new TreeNode(a[i]);
        node.left = last;
        if(stack.empty()) root = node;
        else stack.peek().right = node;
        stack.push(node);
    }
    return root;
}
```

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What's Going On



jovicass said Not only that rand3() should return 0, 1 or 2 ...



alokkumar said O(nlogn) Solution - Create a Min Heap O(n), Extract ...



packersandmove said With a specific end goal to ensure that migration procedure ...



packersandmove said There are many surveys said on the sites of the ...



nansu305 said Here's my solution {{{ import java.util.*; public class HelloWorld ...

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This code has a problem.
By definition root is the minimum of the array,
but the codes seems get the first element as the root of array...?

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- Anonymous 3 years ago | [Flag](#)

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// following is the O(N) time algorithm for constructing Cartesian tree from in-order traversal of the binary search tree (i.e. sorted sequence).

Please suggest improvement

```
static Node cTree(int[] a, int start, int end) {  
  
    // let's construct 1...  
    // for the remaining array...  
    // construct the left child... 2n + 1  
    // construct the right child...2n + 2.  
    if (start > end)  
        return null;  
  
    int key = a[start];  
    Node n = new Node(key);  
    n.left = cTree(a, 2*start + 1, end);  
    n.right = cTree(a, 2*start + 2, end);  
  
    return n;  
}
```

- [Laiq Ahmed](#) 3 years ago | [Flag](#)

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It is never said that it is a BST....

- [rajofchennai](#) 2 years ago | [Flag](#)

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