# 序列化二叉树

## 题目

请实现两个函数，分别用来序列化和反序列化二叉树

## 解题思路

1. 通过前序遍历，进行序列化和反序列化
2. 对于空节点用 $ 来代替

String Serialize(TreeNode root) {  
 if (root==null) return "";  
  
 LinkedList<String> res = new LinkedList<>();  
  
 serialize(res, root);  
  
 StringBuilder builder = new StringBuilder();  
 res.forEach(v-> builder.append(v).append(","));  
  
 return builder.toString();  
}  
  
  
private void serialize(LinkedList<String> res, TreeNode root) {  
 if (root == null) {  
 res.addLast("$");  
 return;  
 }  
  
 res.addLast(String.valueOf(root.val));  
 serialize(res, root.left);  
 serialize(res, root.right);  
}  
  
TreeNode Deserialize(String str) {  
 if (str == null || str.length() == 0) return null;  
  
 return deserialize(str.split(","), new int[]{0});  
}  
  
  
private TreeNode deserialize(String[] str, int[] index) {  
 if (index[0] >= str.length) return null;  
  
 String c = str[index[0]++];  
 if (c.equals("$")) return null;  
  
 TreeNode node = new TreeNode(Integer.valueOf(c));  
 node.left = deserialize(str, index);  
 node.right = deserialize(str, index);  
  
 return node;  
}