Binary Tree & Divide Conquer & DFS & BFS

课程尚未开始，请耐心等待

关注九章算法微信获取最新面试题、题解、面经

面试技巧

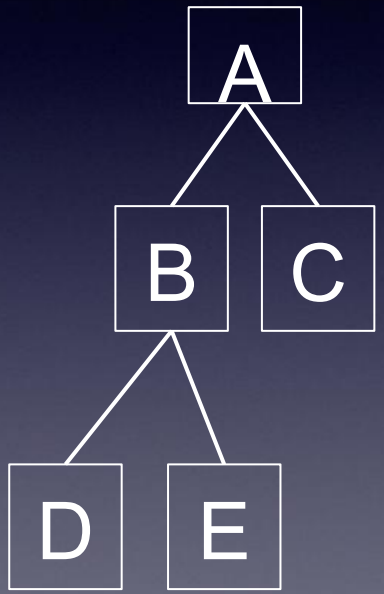
面试时写程序的流程是什么？
是否需要加注释？

Outline

1. Binary Tree DFS Traversal
   - preorder / inorder / postorder
   - Divide & Conquer
   - DFS Template
2. Binary Tree BFS Traversal
   - BFS template
3. Binary Search Tree
   - validate, insert, delete

Binary Tree DFS Traversal

Binary Tree Traversal



Preorder: A BDE C

Postorder: DEB C A

inorder: DBE A C

Binary Tree Preorder Traversal

http://www.lintcode.com/problem/binary-tree-preorder-traversal/
http://www.jiuzhang.com/solutions/binary-tree-preorder-traversal/

Divide & Conquer Algorithm

- Merge Sort
- Quick Sort
- Most of the Binary Tree Problems !

Maximum Depth of Binary Tree

http://www.lintcode.com/problem/maximum-depth-of-binary-tree/
http://www.jiuzhang.com/solutions/maximum-depth-of-binary-tree/

Balanced Binary Tree

http://www.lintcode.com/problem/balanced-binary-tree/
http://www.jiuzhang.com/solutions/balanced-binary-tree/

Lowest Common Ancestor

http://www.lintcode.com/problem/lowest-common-ancestor/
http://www.jiuzhang.com/solutions/lowest-common-ancestor/

Binary Tree Maximum Path Sum

http://www.lintcode.com/problem/binary-tree-maximum-path-sum/
http://www.jiuzhang.com/solutions/binary-tree-maximum-path-sum/

Binary Tree DFS Template

http://www.jiuzhang.com/solutions/dfs-template/

5 minutes break

Binary Tree BFS Traversal

Binary Tree Level Order Traversal

http://www.lintcode.com/problem/binary-tree-level-order-traversal/
http://www.jiuzhang.com/solutions/binary-tree-level-order-traversal/

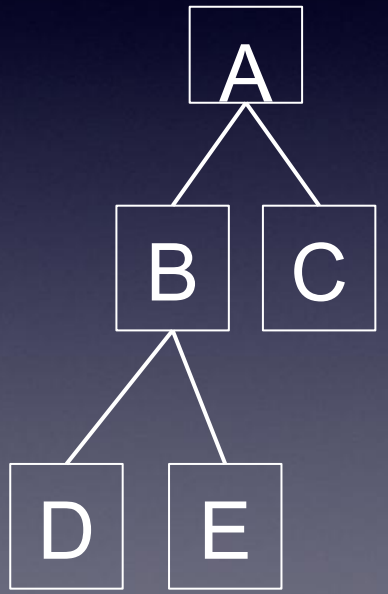
Binary Tree Level Order Traversal

- 2 Queues
- 1 Queue + Dummy Node
- 1 Queue (best)

Binary Tree Level Order Traversal

- 2 Queues
- 1 Queue + Dummy Node
- 1 Queue (best)

A #
A # B C
A # B C # D E



*Binary Tree Level Order Traversal II

http://www.lintcode.com/problem/binary-tree-level-order-traversal-ii/
http://www.jiuzhang.com/solutions/binary-tree-level-order-traversal-ii/

*Binary Tree Zigzag Level Order Traversal

http://www.lintcode.com/problem/binary-tree-zigzag-level-order-traversal/
http://www.jiuzhang.com/solutions/binary-tree-zigzag-level-order-traversal/

Binary Tree BFS Template

http://www.jiuzhang.com/solutions/bfs-template/

Binary Search Tree

Validate Binary Search Tree

http://www.lintcode.com/problem/validate-binary-search-tree/
http://www.jiuzhang.com/solutions/validate-binary-search-tree/

*Insert a Node in Binary Search Tree

http://www.lintcode.com/problem/insert-node-in-a-binary-search-tree/
http://www.jiuzhang.com/solutions/insert-node-in-binary-search-tree/

Search Range in a Binary Search Tree

http://www.lintcode.com/problem/search-range-in-binary-search-tree/
http://www.jiuzhang.com/solutions/search-range-in-binary-search-tree/

Implement iterator of Binary Search Tree

http://www.lintcode.com/problem/implement-iterator-of-binary-search-tree/
http://www.jiuzhang.com/solutions/implement-iterator-of-binary-search-tree/

*Remove Node in Binary Search Tree

http://www.lintcode.com/problem/remove-node-in-binary-search-tree/
http://www.jiuzhang.com/solutions/remove-node-in-binary-search-tree/
http://www.mathcs.emory.edu/~cheung/Courses/171/Syllabus/9-BinTree/BST-delete.html

Remove Node in Binary Search Tree

Steps:

1. Find the node
2. Find the maximum node in the left subtree
3. Replace the node with the maximum node in the left subtree.

Remove Node in Binary Search Tree

Special Cases:

1. The node doest have a left child.
2. The maximum node in the left subtree has a left child.
3. The node is the root of the tree.

Conclusion

Recursion: Traverse vs Divide & Conquer

Non-recursion Pre-order + In-order

BFS Template