课程尚未开始
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Binary Tree

九章算法IT求职面试培训课程 第3章

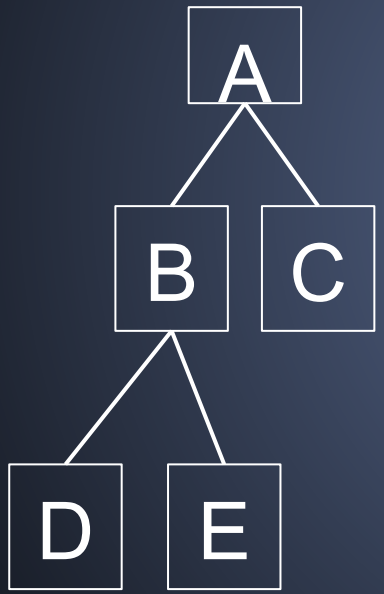
www.ninehchapter.com

Outline

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

Binary Tree DFS Traversal

Binary Tree Traversal



Preorder: A BDE C

Postorder: DEB C A

inorder: DBE A C

Binary Tree Preorder Traversal

http://lintcode.com/en/problem/binary-tree-preorder-traversal/
http://www.ninechapter.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://lintcode.com/en/problem/maximum-depth-of-binary-tree/
http://www.ninechapter.com/solutions/maximum-depth-of-binary-tree/

Balanced Binary Tree

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

Binary Tree Maximum Path Sum

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

Lowest Common Ancestor

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

Binary Tree DFS Template

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

Binary Tree BFS Traversal

Binary Tree Level Order Traversal

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

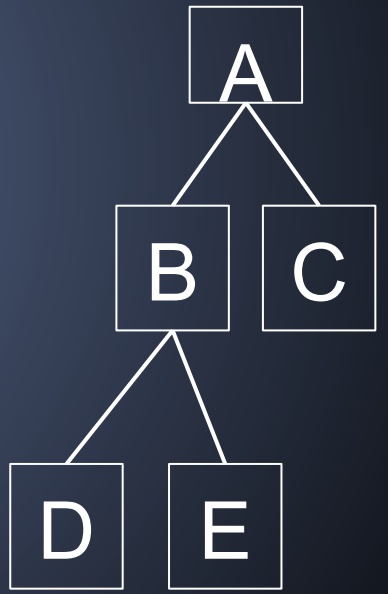
Binary Tree Level Order Traversal

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

Binary Tree Zigzag Level Order Traversal

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

Binary Tree BFS Template

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

Binary Search Tree

Validate Binary Search Tree

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

Insert a Node in Binary Search Tree

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

Search Range in a Binary Search Tree

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

Implement iterator of Binary Search Tree

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

Remove Node in Binary Search Tree

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

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.