

Boğaziçi University
Department of Physics

Phys 499

Spring 2007

Problem Set #6
Due in class Monday, 23 Apr 2007

Problem 1: (20 pts) Cormen 10.4-1

Draw the binary tree rooted at index 6 that is presented by the following fields.

| <i>index</i> | <i>key</i> | <i>left</i> | <i>right</i> |
|--------------|------------|-------------|--------------|
| 1 | 12 | 7 | 3 |
| 2 | 15 | 8 | nil |
| 3 | 4 | 10 | nil |
| 4 | 10 | 5 | 9 |
| 5 | 2 | nil | nil |
| 6 | 18 | 1 | 4 |
| 7 | 7 | nil | nil |
| 8 | 14 | 6 | 2 |
| 9 | 21 | nil | nil |
| 10 | 5 | nil | nil |

Problem 2: (20 pts) Cormen 10.4-2

Write an $O(n)$ -time recursive procedure that, given an n -node binary tree, prints out the key of each node in the tree.

Problem 3: (25 pts) Cormen 10.4-4

Write an $O(n)$ -time procedure that prints all the keys of an arbitrary rooted tree with n nodes, where the tree is stored using the left-child, right-sibling representation.

Problem 4: (35 pts) Cormen 10.4-5

Write an $O(n)$ -time nonrecursive procedure that, given n -node binary tree, prints out the key of each node. Use no more than constant extra space outside of the tree itself and do not modify the tree, even temporarily, during the procedure.