Simeon Ngalamou

Prof. Omari

Algorithms and Data Structures

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WA 5

**Chapter-8:**

**R-8.1:**

1. Which node is the root?
   1. /user/rt/courses/
2. What are the internal nodes?
   1. /user/rt/courses/ , cs016/ , cs252/ , homeworks/ , programs/ , projects/ , papers/ , demos
3. How many descendants does node cs016/ have?
   1. 9
4. How many ancestors does node cs016/ have?
   1. 1
5. What are the siblings of node homeworks/?
   1. grades, programs/
6. Which nodes are in the subtree rooted at node projects/?
   1. papers/ and demos/
7. What is the depth of node papers/?
   1. 3
8. What is the height of the tree?
   1. 4

**R-8.4:** What is the running time of a call to T. height2(p) when called on a position p distinct from the root of T?

1. O(n)

**R-8.21:**  In what order are positions visited during a preorder traversal of the tree of Figure 8.8?

1. - / \* + 3 1 3 + - 9 5 2 + \* 3 - 7 4 6

**C-8.42:** Describe how to clone a LinkedBinaryTree instance representing a (not necessarily proper) binary tree, with use of the add left and add right methods.

1. First create root and then recursively clone the left and right subtree.

**Chapter-9:**

**R-9.3:** What does each remove min call return within the following sequence of priority queue ADT methods: add(5,A), add(4,B), add(7,F), add(1,D), remove min( ), add(3,J), add(6,L), remove min( ), remove min( ), add(8,G), remove min( ), add(2,H), remove min( ), remove min( )?

1. (1,D)
2. (3, J)
3. (4,B)
4. (5,A)
5. (2,H)
6. (6,L)

**R-9.5:** The min method for the UnsortedPriorityQueue class executes in O(n) time, as analyzed in Table 9.2. Give a simple modification to the class so that min runs in O(1) time. Explain any necessary modifications to other methods of the class.

**R-9.21:** Show all the steps of the algorithm for removing the entry (16,X) from the heap of Figure 9.1, assuming the entry had been identified with a locator.

1. delete the (16,X) node from the array
2. replace the deleted node with the node lowest and farthest to the right
3. fix the heap if the value of the node used to replace (16,X) is lesser than its parent

**C-9.26:** Show how to implement the stack ADT using only a priority queue and one additional integer instance variable