Quiz-I ME Software Engineering Advance Data Structures Date: 07.03.2013

Max Marks 10 Max Time 10 Mins

1. The time taken by an efficient algorithm to check whether a given binary search Tree is AVL or not, is
   (a) O(n log n) (b) $O(n^2)$ (c) O(n) (d) O(log n)
2. Which of the following statement is false?
   (a) An AVL tree can be constructed from a sorted array of n elements in O(n) time
   (b) An AVL tree of n elements can be transformed into a sorted double linked list in O(n) time
   (c) A sorted double linked list of n elements can be transformed into an AVL tree in O(n) time
   (d) None of these
3. Let T be a binary search tree on 24 distinct keys; the left subtree T1 has 7 keys and the right subtree T2 has 16 keys. Which of the following is true of the of the 13^{th} smallest of the keys in T?
   (a) It is the 13^{th} smallest key in T2
   (b) It is the 8^{th} smallest key in T2
   (c) It is the 5^{th} smallest key in T2
   (d) It is the 5^{th} smallest key in T1
4. What are the time and space complexities of the DFS algorithm on a graph represented as adjacency matrix?
   (a) O(V+E), O(V) (b) O(V), O(V+E) (c) O(V+E), O(E) (d) O(V+E), O(1)
5. Which defines a greedy algorithm?
   (a) An algorithm which is sub-optimal
   (b) An algorithm that already takes the best immediate, or local, solution while finding an answer
   (c) An algorithm which finds a globally optimal solution
   (d) A brute force algorithm
6. A stack data structure can be implemented using the following technique(s)?
   (a) Sequential Allocation (b) Linked Allocation
   (c) Both A and B (d) neither A nor B
7. How many minimum numbers of stacks are required to implement Queue?
   (a) 1 (b) 2 (c) 3 (d) None
8. Which of the following is true about an in-place sorting algorithm on an array of n elements?
   (a) They takes O(n) extra time to sort
   (b) They takes O(n) extra space to sort
   (c) They takes O(1) extra time to sort
   (d) They takes O(1) extra space to sort
9. Which of the following algorithm sorts singly linked list efficiently, in terms of both time and space?
   (a) Quick sort (b) Merge sort (c) Heap sort (d) Insertion sort
10. How much minimum space does efficient quick sort takes in the worst case to sort n numbers?
    (a) O(log n) (b) O(n) (c) O(n log n) (d) O(1)
11. Suppose we start with an initially empty AVL tree and then insert the keys 2, 1, 5, 4, 3 in that order, using the insertion algorithm with rebalancing. What would be the preorder traversal of the resulting tree?
    (a) 5, 2, 1, 4, 3 (b) 2, 1, 4, 3, 5 (c) 4, 2, 1, 3, 5 (d) 3, 2, 1, 4, 5