Reg. No. : | | | | | | | | | | |

Question Paper Code: 52131

M.E. DEGREE EXAMINATION, DECEMBER 2015

First Semester

Computer Science and Engineering

15PCS101 - ANALYSIS OF ALGORITHMS AND DATA STRUCTURES

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. The worst case analysis of linear search for *n* elements is given by

   (a) *O(1)* (b) *O(n)* (c) $O(n^2)$ (d) *O (log n)*

2. The max heap is also called as _____ heap.

   (a) Descending (b) ascending (c) fibonacci (d) skew

3. The depth of a binary search tree is given by

   (a) *O(n log2n)* (b) *O(log2n + 1)* (c) *O(log2n)* (d) *O(log2n + 1)*

4. K-d trees recursively divide k-dimensional space into _____ half spaces.

   (a) Three (b) k (c) two (d) four

5. The list ranking algorithm is _____.

   (a) EREW (b) CREW (c) ERCW (d) CRCW

PART - B (5 x 3 = 15 Marks)

6. List the various asymptotic notations.

7. Define Heaps.

8. Mention the properties of splay trees.

9. Construct segment tree for the given input array [1, 3, 5, 7, 9, 11]

10. Compute prefix sum for the following: S = {1, 4, 5, 7, 9, 2, 10, 2, 6, 0, 1}

PART - C (5 x 16 = 80 Marks)

11. (a) Solve the following recurrence equation for n with a power of 2.
$T(n) = 2T(n/2) + \log n$ subject to $T(1) = 1$. (16)

Or

(b) Estimate the time complexity of linear search algorithm and give an example. (16)

12. (a) (i) Explain in detail the cost amortization of binomial heap. (10)

(ii) When does binomial heap becomes lazy binomial heap? (6)

Or

(b) Explain the operations of insertion and deletion in Fibonacci heaps with an example. (16)

13. (a) Show the two cases that arise when inserting into the left subtree of an AVL tree might violate the height invariant and show they are repaired by a right rotation or double right rotation. Which two single rotations does the double rotation consist of in this case? (16)

Or

(b) Construct B - Tree of Order 3 for the following elements:
45, 22, 12, 67, 89, 34, 61, 2, 9, 27, 25, 81, 18, 76, 54, 43, 72 and perform deletion of the elements 2, 27 and 34. (16)

14. (a) Illustrate how you will check whether any two segments intersect, given n line segments. (16)

Or

(b) Differentiate between the working of package/gift wrapping and graham scan algorithms when convex hulls are computed. (16)

15. (a) Explain the list ranking algorithm with suitable example. (16)

Or

(b) Justify that EREW is less efficient than CREW with an example. (16)
