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Question Paper Code : 53202

B.E./B.Tech. DEGREE EXAMINATION, DEC 2020

Third Semester

Computer Science and Engineering

15UCS302 -DATA STRUCTURES

(Regulation 2015)

Duration: One hour

Maximum: 30 Marks

PART A - (6 x 1 = 6 Marks)

(Answer any Six of the following Questions)

1. The maximum number of nodes in a binary tree of height h is CO1- R
(a) $h-1 \ 2+1$ (b) $h+1 \ 2-1$ (c) $h*1 \ 2-1$ (d) $h-1 \ 2-1$
2. The number of edges from the root to the node is called _____ of the tree. CO1- U
(a) Height (b) Depth (c) Length (d) Branch
3. In a max-heap, element with the greatest key is always in _____. CO2- R
(a) Leaf node (b) First node of left sub tree
(c) Root node (d) First node of right sub tree
4. What are the worst case and average case complexities of a binary search tree? CO2- U
(a) $O(n), O(n)$ (b) $O(\log n), O(\log n)$ (c) $O(\log n), O(n)$ (d) $O(n), O(\log n)$
5. Heap can be used as _____. CO3- R
(a) Priority queue (b) Stack
(c) A decreasing order array (d) None of the mentioned
6. The minimum number of elements in a heap of height h is CO3- R
(a) 2^{h+1} (b) 2^h (c) $2^h - 1$ (d) 2^{h-1}
7. Assuming a heap is complete, how many levels deep is a heap containing N nodes guaranteed to be? CO3- R
(a) $\log(N)$ (b) $N\log(n)$ (c) $\log(1/N)$ (d) $\log(N^2)$

8. If several elements are competing for the same bucket in the hash table, what is it called? CO4- U
- (a) Diffusion (b) Replication (c) Termination (d) Collison

9. How many key values encountered collision using the hash function $h(k) = k \text{ mod } 10$ and linear probing will result in the hash given below? CO5- App

0	
1	
2	42
3	23
4	34
5	52
6	46
7	33
8	
9	

- (a) 2 (b) 3 (c) 4 (d) 5
10. Given an undirected graph G with V vertices and E edges, the sum of the degrees of all vertices is CO5- R
- (a) E (b) $2E$ (c) V (d) $2V$

PART – B (3 x 8 = 24 Marks)

(Answer any Three of the following Questions)

11. Define Binary Tree. Construct Binary tree from the in-order and pre order traversal given and find the pre order traversal from the Binary tree. CO1-U (8)
- Inorder: H D I J E K B A L F M C N G O
Postorder: H I D J E B L M F N O G C A
12. Construct AVL Tree for the following data CO2-U (8)
1,2,3,4,8,7,6,5,11,10,12.
13. Explain Insertion in Deap and construct deap for the following CO3- U (8)
elements. 14,8,78,2,85,68.
14. What is hashing? Explain open addressing and separate chaining CO4- U (8)
methods of collision resolution techniques with examples.
15. Explain Dilkstra’s single source shortest path problem with neat CO5-U (8)
example.

