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Name.................................

Reg. No.............................

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, DECEMBER 2014

(CUCSS)

Computer Science

CSC 1C 02—ADVANCED DATA STRUCTURES

Maximum : 36 Weightage

Time : Three Hours

Part A

(Answer **all.** *Each question carries a weightage of 1).*

1. Provide an example to distinguish between a data structure and its representation.

2. Write the postfix form of following expressions

    (a). – A + B – C + D (b). (A + B) D + E / (F + A * D) + C

3. What are the types of traversals defined on a binary tree ? Explain.

4. Why is rehashing required ? Explain a method for achieving it.

5. Give an example of a 1 - 2 - 3 deterministic skip list.

6. What is a B* tree ? How it differ from a B tree ?

7. Define d-heaps as a generalisation of binary heaps.

8. What is a treap structure ?

9. How is priority queue is related to max heap ?

10. What is the worst case and average case search time on a digital search tree ?

11. Give a comparison between AA tree and red-black tree.

12. Define a binomial queue. How is it related to binomial tree ?

(12 x 1 = 12 weightage)

Part B

Answer any **six.** *Each question carries a weightage of 2*

13. Define a circularly linked list. Write the operations defined on it.

14. Find an expression for maximum number of nodes defined on a binary tree Prove the claim.

15. Outline graph representation techniques. Provide examples.

16. Show the result of inserting following keys into an initially empty 2-3 tree: 3, 1, 4, 5, 9, 2, 6.

17. Outline extendible hashing.

18. Define Leftist heap structure. Explain the merge operation.

19. Illustrate zig, zig-zag and zig-zig operations on a splay tree.

Turn over

20. Define a digital search tree on the set {A, B, C, D, E, F, G, H} . Illustrate searching this tree for the letter E.

21. What are differential files ? Explain how these can be used for compression.

(6 x 2 = 12 weightage)

Part C

(Answer any **three.** *Each question carries a weightage of 4).*

22. Define a min heap. Explain heap sorting on this heap.

23. Explain BFS traversal on a graph.

24. Prove that for a perfect binary tree of height h, containing 2^{h+1} -nodes, the sum of the heights of the nodes is $2h^{+1} - 1 - (h + 1)$.

25. What is hashing ? Explain probing techniques with suitable examples.

26. Write algorithm to insert and delete a node from a red-black tree.

27. Outline operations on a Fibonacci heap.

(3 X 4 = 12 weightage)