

D 53016

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Name.....

Reg. No.....

FIRST SEMESTER M.Sc. DEGREE EXAMINATION, JANUARY 2014

(CUCSS)

Computer Science

CSC 1 C02—ADVANCED DATA STRUCTURES

Time : Three Hours

Maximum: 36 Weightage

Part A

*Answer **all** questions.
Each question carries a **weightage** of 1.*

1. Distinguish between a data structure and its representation.
2. What are infix and postfix expressions ? What are their uses ?
3. What is a threaded binary tree ? Why such a structure is required ?
4. Define inverse adjacency list of a graph.
5. Explain any *two* collision resolution strategies used in hashing.
6. What is a recurrence relation ?
7. What are the structural properties of a B-tree ?
8. Give an example of a binary heap defined on an array.
9. Draw a binomial tree of order B_3 .
10. What is a trie ?
11. What is amortized analysis ?
12. How skew heaps are related to leftist heaps ?

(12 x 1 = 12 weightage)

Part B

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

13. Define a linear list. Write operations defined on this list.
14. Outline row major representation of a 2D array.
15. Provide possible traversals on a binary tree with examples.
16. Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and $h(x) \propto (x) \pmod{10}$ as hash function. Show the resulting open address hash table using linear and quadratic probing.

Turn over

17. Explain merge operation defined on a binomial heap.
18. Illustrate decrease key operation on a Fibonacci heap.
19. What is topological sorting ? Explain with a suitable data structure.
20. Explain how a 2-d tree is suitable for range queries.
21. Explain two-pass merging of pairing heaps.

(6 x 2 = 12 weighta

Part C

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

- 22 Define a polynomial as a computer structure. Write a complete specification of the data structure polynomial.
23. Define a circularly linked list. Write an algorithm Length (x) to count the number of nodes in a circularly linked list
24. What is a red-black tree ? Explain the properties and operations defined on it.
25. Define a B-tree. Illustrate insertion and deletion routines for a B-tree.
26. Write down deletion process for a 1-2-3 deterministic skip list.
27. Write a recursive routine to insert a node in a **treap** structure.

(3 x 4 = 12 weightage)