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

Z 3504

M.C.A. DEGREE EXAMINATION, MAY/JUNE 2008.

First Semester

MC 1604 — DATA STRUCTURES

(Regulation 2005)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Write the applications of stack.

2. Differentiate the linear list and linked list.

3. Define sibling, height of a tree.

4. What is tree traversal? Write the routine for inorder traversal.

5. Write the time complexity for merge and radix sort.

6. Why do we go for double hashing?

7. What is transitive closure? Write its worst case complexity?

8. Define single source and all-pairs shortest path problem.

9. Write the need for compaction.

10. What is garbage collection? How is it performed?

PART B — (5 × 16 = 80 marks)

11. (a) The problem: it has n people, numbered from 1 to n, are sitting in a circle. Starting at person 1, a hot potato is passed. After m passes, the person holding the potato is eliminated, the circle closes ranks, and the game continues with the person who was sitting after the eliminated person picking up the hot potato. The last remaining person wins. Thus, if m=1 and n=5, player 3 wins and the order of elimination is 2,4,1,5. Use suitable data structure to solve the problem. (16)

Or

(b) Discuss and Write the routines to implement two Stacks using only one array. Your stack routine should not declare an overflow unless every slot in the array is used. (16)

12. (a) Explain Huffman coding algorithm with example and write the routines to generate Huffman trees. (16)

Or

(b) (i) Construct a Binary Search Tree using 10 distinct keys. Write the procedure to sort the keys in increasing order using proper tree traversal. (10)

(ii) Write short notes on threaded binary tree. (6)

13. (a) (i) Write the routines to sort n elements using merge and insertion sort. (10)

(ii) Ascend the data 2,7,4,5,9,3,1,6 using the above algorithms. (6)

Or

(b) (i) Briefly explain the various hashing techniques. (8)

(ii) Given input {371, 323, 173, 199, 344, 679, 989} and hash function $h(x) = x \ mod \ 10$, show the resulting. (8)

(1) Separate Chaining.

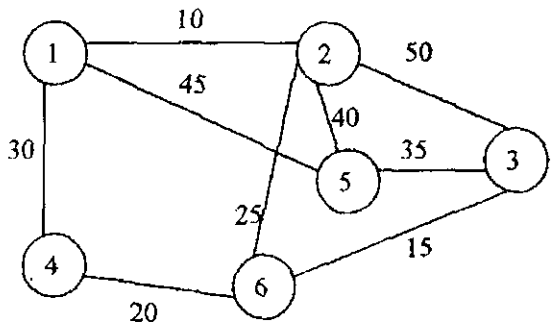
(2) Closed hashing using linear probing, quadratic probing and double hashing $h_2(x) = 7 - (x \ mod \ 7)$.

14.

15.

14. (a) (i) Write the routines for Prim's and Kruskal's algorithm to find the minimum spanning tree of the graph G. (8)

(ii) Find the minimum spanning tree for the following graph using Prim's and Kruskal's algorithm. (8)



Or

(b) Discuss in detail about flow problem with proper example and write the routine for Ford-Fulkerson algorithm. (16)

15. (a) Discuss in detail about Automatic List Management. (16)

Or

(b) Write the routines to check whether the given string is Palindrome or not. Use the basic operations of doubly linked list to perform the same.(16)

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