(Please write your Exam Roll No.) *Exam Roll No.* 08250604413

END TERM EXAMINATION

SECOND SEMESTER [MCA] MAY-JUNE-2014

Paper Code: MCA-102 (2010 onwards) ***Subject: Data & File Structure***

Time: 3 Hours ***Maximum Marks:60***

Note: Attempt any five questions, including Q.no.1 is compulsory. Select one question from each unit.

Q1 Attempt any **Eight** of the following:- **(8x2.5=20)**

(a) Name any two O ($\log_2 n$) searching algorithms.
(b) State two situations when you would prefer using arrays over linked lists.
(c) Explain how a deque may be used both as a stack and a queue.
(d) Draw an expression tree for storing the expression a+b*c.
(e) Explain how can a binary tree be stored in the form of an array? For which kind of tree is this storage most efficient?
(f) What is the advantage of a Threaded Tree over a simple BST? What is the overhead?
(g) What is meant by Transitive Closure of a graph? What is it use?
(h) State any two applications of generating Minimum Spanning Tree for a Graph.
(i) What is the limitation of using linear probing to resolve collisions while hashing? How can you overcome the limitation?
(j) What is buffering and when is it useful?
(k) What is the cause of inefficiency in External Sorting using K+1 tapes?

Unit-I

Q2 (a) Write a C function to merge two sorted linked lists. The resulting list should also be sorted. **(5)**

(b) Demonstrate the use of stacks of check if parentheses in an arithmetic expression are balanced or not. Clearly show the state of the stack in both (i.e. balanced and unbalanced) cases. **(5)**

Q3 (a) Write a C function to convert an infix expression to postfix. **(5)**

(b) Explain with reasons and examples the situations when you would prefer storing a polynomial in an array. Also explain (with reasons) when would you prefer using a linked list. **(5)**

Unit-II

Q4 (a) Demonstrate AVL rotational when the nodes with keys 10, 20, 32, 35, 25, 27 are inserted in an AVL tree. **(4)**

(b) Write a C function to insert a node in a Right In-Threaded tree. **(6)**

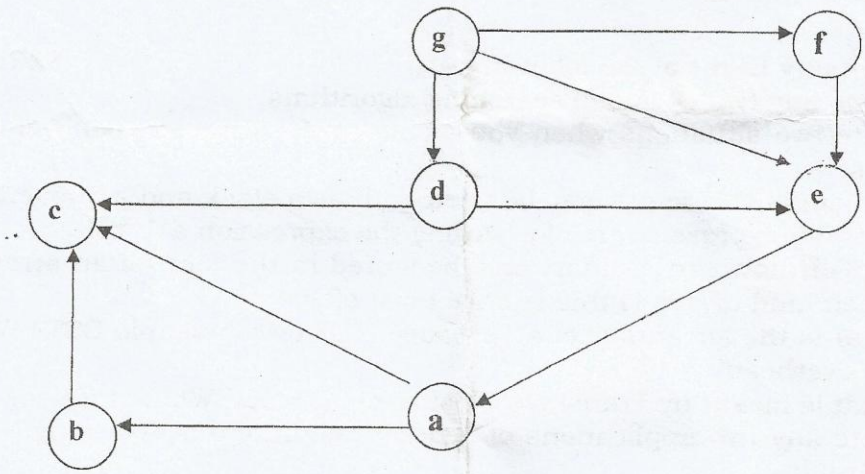
Q5 (a) Demonstrate the insertion of the key (1,2,3,4,8,7,6,5,9,10,11,12,16,15,14,13) in a B-tree of order 5. **(5)**

(b) Write a C function to evaluate an expression tree. **(5)**

P.T.O.

Unit-III

Q6 (a) Demonstrate Topological Sorting on the following graph:- **(5)**



(b) Explain different collision resolution techniques used while hashing. **(5)**

Q7 (a) Write a C program to add an edge to an **undirected graph**. The input provided to the program is the labels of the starting and the ending node of the edge. **(5)**

(b) Give the average case time complexities of the following sorting algorithms. Also state the situations when these algorithms are **not suitable** to be used: **(5)**

(i) Quick Sort.
(ii) Merge Sort.
(iii) Radix Sort.
(iv) Bubble Sort.

Unit-IV

Q8 (a) Explain the use of buffering. What is double buffering? **(3)**

(b) Explain the process of updating a master file on basis of a transaction file in case of sequential file organization. **(3)**

(c) Write a short note on K-way merge sorting using 2*K tapes. **(4)**

Q9 (a) Explain error control using parity bits. **(3)**

(b) Explain with reasons, the situations where sequential file storage is more advantages as compared to other file organizations. **(3)**

(c) Write a short note on polyphase merge sore. **(4)**

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