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Manipal Institute of Technology

(Constituent Institute of Manipal University)

Manipal – 576 104

SECOND SEMESTER M. C. A. END SEMESTER EXAMINATIONS– May, 2014

SUBJECT: –DATA STRUCTURES-(MCA-504)

(Revised Credit System)

Date: 17/05/2014

TIME: 3 HOURS] [MAX.MARKS: 50

Instructions to Candidates:

- **Answer any 5 FULL questions.**
- **All questions carry equal marks.**
- **Missing data if any may be suitably assumed and mention your assumptions.**

1A. Obtain the addressing formula for accessing an element A[i_1][i_2][i_3] in a 3-dimensional array declared as A[10][5][6] in C/C++. Assume one word per element and 'b' the base address of array A.

1B. Write a recursive function for reversing a singly linked list.

1C. Convert the following expression to postfix expression.

X = (((A / (B - C)) * (D - E)) – (A * C))

(5 + 3 + 2)

2A. Explain how we can implement multiple stacks using a single array for storage.

2B. Explain the different ways of representing graphs in computers. Mention the merits and demerits of each representation

2C. Construct the binary tree whose inorder traversal is B, C, A, E, D, G, H, F, I and preorder traversal is A, B, C, D, E, F, G, H, I.

(5 + 3 + 2)

3A. Explain the different cases that occur while deleting a node in a binary search tree and solution to each.

3B. Write a function for comparing two binary search trees for equality. The function should return a value true if they are equal otherwise false.

3C. Illustrate the working of quick sort with a suitable example.

(5 + 3 + 2)

4A. Write a function for performing heap sort. Trace it for the following data

32, 33, 55, 19, 56, 11, 34, 23, 35, 65, 76, 21

4B. Suppose the sets A and B are represented using linked representation, explain how one can find the union of two sets . Give an algorithm.

4C. Differentiate between 2-way merge and natural merge sort.

(5 + 3 + 2)

5A. Explain the hashing and different collision resolution techniques with suitable example.

5B. Evaluate the following postfix expression 2 2 + 3 * 4 – 5 2 *+. Show the instance of stack during evaluation.

5C. Write a function to count the number of leaf nodes in a binary tree.

(5 + 3 + 2)

6A. Write the algorithms for pre-order, inorder, and post-order binary-tree traversal assuming linked representation.

6B. Explain a threaded binary tree with an example. How can we perform inorder traversal in a threaded binary tree?

6C. Explain the working of Naive string matching Algorithm considering T=bacbababaabcbab and P=ababaca.

(5 + 3 + 2)

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