MCA.I/12.15.1090 Reg. No. | | | | | | | | |

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MCA DEGREE I SEMESTER EXAMINATION DECEMBER 2015

CAS 2101 DATA STRUCTURES AND ALGORITHMS

(2014 – Revised Supplementary)

Time: 3 Hours Maximum Marks: 50

PART A

(Answer ***ALL*** questions)

(15 × 2 = 30)

I. (a) What is a sparse matrix?
(b) What is the importance of a hash function?
(c) Write algorithm for doing bubble sort.

II. (a) Give any two advantages of linked lists over arrays.
(b) What are the properties of stacks?
(c) What is meant by backtracking?

III. (a) Describe the properties of a binomial heap.
(b) Differentiate between linear probing and quadratic probing.
(c) Derive an expression for the maximum number of nodes a binary tree of height "h" can have. Assume the root nod is at level '0'.

IV. (a) What are the properties of binary search trees?
(b) Explain expression trees.
(c) How are trees differing from graphs?

V. (a) Differentiate between DFS and BFS.
(b) Define the minimum spanning tree of a graph.
(c) Explain B trees.

PART B

(5 × 4 = 20)

VI. Write a program to implement quick sort.

OR

VII. Explain the procedure for sorting an array of elements using merge sort method.

VIII. Describe briefly about recursive functions.

OR

IX. How can queues be implemented using linked lists?

X. Explain the procedures for inserting and deleting elements to/from a binomial heap.

OR

XI. Compare the various binary tree traversal methods.

XII. Explain how a graph can be represented using an adjacency matrix.

OR

XIII. Draw a binary search tree corresponding to the input 25, 60, 71, 19, 30, 40, 9, 10, 25, 65, 81. What will be the resultant tree after the deletion of the element '60'?

XIV. Explain Dijkstras algorithm for finding the shortest path.

OR

XV. Explain Kruskals algorithm for finding the minimum spanning tree in a graph.

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