MCA DEGREE III SEMESTER EXAMINATION NOVEMBER 2015

CAS 2301 ADVANCED DATA STRUCTURES AND ALGORITHMS
(Regular)

Time: 3 Hours   Maximum Marks: 50

PART A
(Answer *ALL* questions)

$(15 \times 2 = 30)$

I.   (a) Define asymptotic notations for representing the time complexity while running algorithms.

   (b) Order the following functions by growth rate: n^{15}, n^2, $n\log n$, $n\ \log\log n$, $n\log 2$.

   (c) Compare the time complexity of linear search and binary search.

II. (a) What is an abstract data type? What is significance?

   (b) Write the routine to delete a node from a singly linked list.

   (c) What is a binary search tree?

III. (a) What do you mean by separate chaining?

   (b) Describe heap order property.

   (c) Why is the time complexity of heap sort logarithmic?

IV. (a) What is topological sorting? Why is a cyclic graph not suitable for topological sorting?

   (b) Define residual edge, residual graph and augmenting path in network flow problem.

   (c) What is a minimum spanning tree? What is the difference between Prim's and Kruskal's algorithm for finding MST? Which ADT can be used in both algorithms to operate efficiently?

V.   (a) What is Huffman code?

   (b) Explain the best fit algorithm in bin packing.

   (c) What is divide and conquer technique?

PART B

$(5 \times 4 = 20)$

VI.   Describe different algorithms for solving maximum subsequence sum problem.

OR

VII. What are the general rules for finding the complexity of an algorithm?

VIII. What are the ADT operations in binary tree and show how binary tree can be used as an expression tree.

OR

IX.   What is the difference in array implementation and linked list implementation of stack?

X.   What are the different collision resolution techniques in closed hashing?

OR

XI.   Explain quick sort and analyze the time complexity of the algorithm.

XII. Describe Dijkstra's algorithm for finding shortest path.

OR

XIII. Explain bipartite matching.

XIV. Explain the greedy method used in scheduling problems.

OR

XV.   Describe the divide and conquer method used in selection problem.

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