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[5668]-183

S.E. (Computer Engg.) (First Semester) EXAMINATION, 2019

DATA STRUCTURES AND ALGORITHMS

(2015 PATTERN)

Time : Two Hours

Maximum Marks : 50

Instructions to the candidates:

1. Solve Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.
2. Neat diagrams must be drawn wherever necessary.
3. Figures to the right indicate full marks.
4. Assume suitable data, if necessary.

- Q. 1(a) What is the complexity of an algorithm. Explain with an example [3]
(b) Write a short note on Linear and Non-Linear data structure with example. [4]
(c) Write a C/C++ program that counts the number of times a given int/data occurs in an array. [6]
- OR
- Q. 2(a) Explain the Asymptotic notations. Plot the graph for Big O, Omega and Theta with respect to input vs time. [3]
(b) What is Divide and Conquer strategy? [4]
(c) Write C/C++ pseudocode to perform the simple transpose of sparse matrices. Also, discuss its time complexity. [6]
- Q. 3(a) Write an algorithm to delete an intermediate node from a doubly linked list. [3]
(b) Write Pseudo C/C++ code to reverse the singly linked list [4]
(c) Convert following infix expression to postfix expression: [6]
$$((A + B) - C * (D / E)) + F$$

Use stack and show step by step conversion
- OR
- Q. 4(a) What is recursion? Explain use of the stack for "Undo Operation in a word processor (MS Office/Open Office)" [3]
(b) Write pseudo C/C++ code to represent a stack as an ADT [4]
(c) Write an algorithm for traversing a singly linked list that deletes all the nodes having negative key/value [6]
- Q. 5(a) Write a pseudo C/C++ code to implement a circular queue using arrays. [6]
(b) Explain Linear queue and Circular queue with suitable example. Give advantages of Circular queue over Linear queue. [6]

P.T.O.

- OR
- Q. 6(a) Define the following terms with examples [6]
i) Linear Queue
ii) Dequeue
iii) Priority Queue
- (b) Explain priority queue. Give pseudo C/C++ code for the array implementation of a priority queue. [6]
- Q. 7(a) What is Heap? Explain heap sort with suitable example. State its complexity. [6]
- (b) Explain quick sort and sort the given list using quick sort [6]
15, 08, 20, -4, 16, 02, 01, 12, 21, -2
- OR
- Q. 8(a) Sort the following numbers using Merge sort. [6]
55, 85, 45, 11, 34, 05, 89, 99, 67
- (b) Explain the algorithm of Quick sort with suitable example. Discuss its time complexity and space complexity [6]