3E2073

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B.Tech. (Sem. III) (Main/Back) Examination, January - 2012
Computer Engg. & Information Tech.
3IT3 & 3CS3 Data Structures & Algorithms

Time : 3 Hours] [Total Marks : 80

[Min. Passing Marks : 24

Instructions to Candidates :

Attempt any five questions selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.
(Mentioned in form No. 205)

1. Nil 2. Nil

UNIT - I

1 (a) Why space and time complexity must be considered while writing a code ?

(b) What will be the complexity for the expression $\sum_{Koi}^{n} 0(n)$ where $0(n)$ stands for order n ?

(c) Differentiate between raw major and column major form of arrays.

6+5+5

OR

1 (a) Out of the sorting techniques studied, which sorting techniques are $0\left(n^2\right)$ and which are $0\left(n \log_2^n\right)$?

(b) What do you mean by base address in an array ? How it is used in calculating the address of elements in 2D array ?

(c) Write a short note on "Asymptotic Notation".

5+6+5

UNIT – II

2 (a) Write an algorithm for multiplication of two polynomials.

(b) Write an algorithm for conversion of infix expression to prefix expression and give prefix form for (A * B + (C/D) – E).

8+8

OR

2 (a) Write an algorithm for transpose and multiplication of sparse matrices.

(b) Write an algorithm for dequeue and circular queue.

8+8

UNIT – III

3 (a) Write short notes on :

(i) Header Linked list

(ii) Implementation of linked list in memory.

(b) Write an algorithm to add two polynomials using Doubly Linked List.

8+8

OR

3 (a) Write an algorithm for adding and deleting nodes from an ascending order linked list.

(b) Write an algorithm for binary search. Calculate its time complexity also.

8+8

UNIT – IV

4 (a) What is general true ? How will you implement it in memory ?

(b) What is AVL tree ? Insert the following numbers into an AVL tree :

28, 73, 85, 74, 72, 13, 11, 6

8+8

OR

4 (a) Write short notes on :

(i) Multiway tree

(ii) Threaded binary tree.

(b) Discuss use of trees in the representation of sets. How will you find the union of two sets ?

8+8

UNIT – V

5 (a) Differentiate between tree and graph.

(b) Write Prim's algorithm.

(c) Explain BFS in undirected graph.

5+6+5

OR

5 (a) Write heap sorting algorithm.

(b) How will you represent graphs using adjacency matrix and list ?

(c) Write Kruskal algorithm.

5+6+5