

(b) Explain with a suitable example the principle of operation of heap sort. [4]

OR

Q.5 (a) What is sorting? Write an algorithm to sort the real numbers using insertion sort and selection sort. What is the time complexity for both selection and insertion sort? [2+8+2=12]

(b) What is difference between an internal sorting and external sorting? [4]

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B. Tech III Sem. (Main/Back) Exam. Jan. 2016
Computer Engineering & Information Technology
3CS2A & 3IT2A Data Structures and Algorithms
Common for EX, EC, EI

Time: 3 Hours

Maximum 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

Q.1 (a) What is an Algorithm? Explain time and space analysis of an algorithm with suitable example. [8]

(b) What do you understand by best, worst and average case analysis of an algorithm? [8]

OR

Q.1 (a) Why are asymptotic notations important? Explain the concept of Big-oh, theta & omega in brief. [8]

(b) Explain row major & column major form of array with suitable example. [8]

UNIT-II

- Q.2 (a) Explain transposition of sparse matrices with algorithms of varying complexity. [8]
- (b) Write down an algorithm for insertion & deletion operation performed on the deque. [8]

OR

- Q.2 (a) What do you mean by tower of Hanoi problem? Explain with suitable example. [8]
- (b) Transform the following expression in Postfix Notation:
 $A * (B + D) / E - F * (G + H / K)$ [8]

UNIT-III

- Q.3 (a) Write an algorithm to delete a node from doubly linked list, where a node contains one data and two address (previous & next) portion. [8]
- (b) How can a polynomial such as $5x^4 - 3x^2 + 9x - 11$ be represented by a linked list? [8]

OR

- Q.3 (a) Explain the advantages of binary search over sequential search. [8]
- (b) Discuss concepts of Head Node in linked lists in brief with suitable example. [8]

UNIT-IV

- Q.4 (a) What is binary tree? Mention the properties of a binary tree. Define the following- [8]
- (i) Strictly binary tree
- (ii) Complete binary tree

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- (b) The in-order & pre-order traversal sequence of nodes in a binary tree are given below: [8]

In-order: E A C K F H D B G

Pre-order: F A E K C D H G B

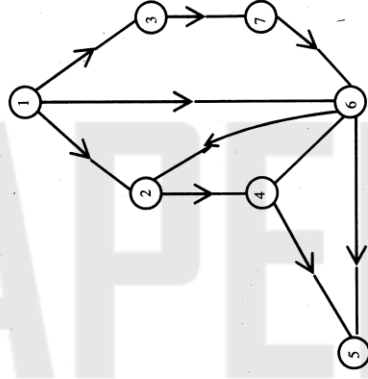
Draw the binary tree. State briefly the logic used to construct the tree.

OR

- Q.4 (a) Explain concept of balance factor in AVL tree with suitable example. [4]
- (b) Insert the following keys in the order given below to build them into an AVL tree. [4]
- g, h, s, l, e, m, t, u.
- Mention different rotations used and balance factor of each node.
- (c) Write an algorithm for inorder traversal of a threaded binary tree. [8]

UNIT-V

- Q.5 (a) Find -
- (i) BFS Traversal
- (ii) DFS Traversal



For Given Graph. Explain in brief.

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