52 (2) DSAL 2·3

2015

DATA STRUCTURE AND ALGORITHM

Paper : 2·3

Full Marks : 60

Time : Three hours

***The figures in the margin indicate
full marks for the questions.***

1. Answer the following questions :   1×7=7

   (a) The proper choice of data structure allows major improvement in program efficiency. *(State true or false)*

   (b) In linked list, the logical order of elements is same as their physical arrangement. *(State true or false)*

   (c) State an application of queue.

   (d) Recursion uses ————— as an internal data structure. *(Fill in the blank)*

(e) What is the number of nodes in a complete binary tree of depth '*K*' ?

(f) Does binary search perform efficiently on a linked list ?

(g) Time complexity of insertion sort algorithm in the best case is ————. *(Fill in the blank)*

2. Answer **any four** questions.   2×4=8

(a) What are the limitations of arrays ?

(b) Consider the following declaration
      int arr [10] [15] ;

   Assume that an integer needs 4 bytes and base address of *arr* is 100, find the address of the element *arr* [5] [7].

(c) What is a linked list ?

(d) Define stack with a suitable example.

(e) What is worst case analysis ?

(f) What is meant by external sorting ?

3. Answer **any three** questions.   5×3=15

(a) Write an algorithm to find sum of odd elements of a two-dimensional array.

(b) Write an algorithm to insert a node at the end of a noncircular singly linked list.

(c) Compare the process of deleting an element from a singly linked list with the process of deleting an element form an array structure.

(d) Write an algorithm to convert an expression from infix to postfix.

(e) The order of nodes of a Binary tree in preorder and inorder are as under :
      Preorder : A B D G H C E F I K J
      inorder : B G H D A E C I K F J

   Draw the Corresponding Binary tree.

4. Answer **any three** questions.   10×3=30

(a) Assuming a queue representation through doubly linked list, write algorithm for addition and deletion of an element in a queue.

(b) Write non-recursive algorithms for inorder and postorder traversal of Binary tree.

(c) Write an algorithm to delete a node from Binary Search tree.

(d) Write an algorithm to implement quick sort technique and discuss about its efficiencies.

(e) Show the steps of sorting the following sequence in ascending order using heap sort method.

7, 2, 9, 5, 3, 6.

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