

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
MCA SEM-II Examination- Dec.-2011

Subject code: 620001

Date: 13/12/2011

Subject Name: Data Structure (DS)

Time: 02.30 pm-05.00 pm

Total marks: 70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Do as Directed 07

1. Which are the common operations that are to be performed on primitive data structures?
2. Define Data Structure.
3. What will be the address of the element $a(i, j)$ in an array, where data is stored as column major with m rows and n columns.
4. Define stack. Write at least two applications of stack.
5. What is the main disadvantage of circularly linked list over singly linked list?
6. Write at least three operations normally performed on Tree.
7. Define Path.

- (b) 1. What do you understand by collision? 01**
- 2. What are the operations performed on stack? Write algorithm to change the i^{th} element from the top of the stack. 03**
- 3. Write an algorithm to delete an element from the circularly linked list. 03**

Q.2 (a) Write an algorithm to delete a node from a singly linked list. Where the list is an ordered list. The node to be deleted may be in the beginning of the list or may be at the end of the list or somewhere in the middle of the list. Consider all the situations. 07

- (b) Write an algorithm to convert a parenthesized infix expression, given in the form of a string, into its equivalent postfix expression. 07**

OR

- (b) When we use doubly ended queue? Write separate algorithms for deleting an element from a doubly ended queue and to insert an element into a doubly ended queue. 07**

Q.3 (a) 1. In which situation linked list data structure is used? What are the disadvantages of linked list data structure? 03

- 2. Write an iterative algorithm to traverse a binary tree in postorder traversal. 04**

- (b) For what purpose the Breadth First Search (BFS) and the Depth First Search (DFS) are used? Explain the BFS and DFS searching procedures with an example. 07

OR

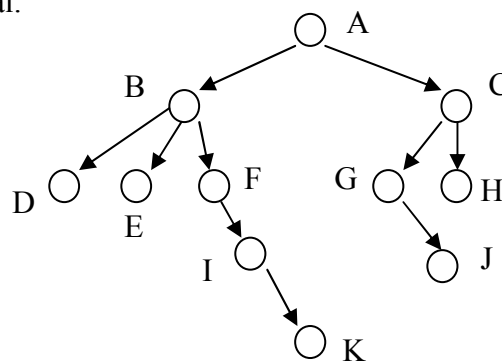
- Q.3 (a) What is the importance of HEAD node? Explain the threaded storage representation of a binary tree with suitable example. Thread the tree for post order traversal. 07

- (b) The inorder traversal of a tree is given below with H as the root node. 07

Inorder: F D B E A H G C K I J

The binary tree has three levels, if the root node is considered as level 0 (Zero). Draw the tree and traverse it in postorder traversal.

- Q.4 (a) Define Complete Binary Tree. Convert the following tree into its equivalent binary tree. Write the result if the tree is traversed in preorder traversal. 07



- (b) Define Graph. State its different storage representations. Explain the Matrix representation of a Graph. If A is the matrix representation of a graph, What A^2 , A^3 , ..., A^n indicate? 07

OR

- Q.4 (a) Write an algorithm to delete a node from a lexically ordered binary tree. 07

- (b) State the different sorting techniques you have studied. Explain the merge sort with suitable example. 07

- Q.5 (a) What is the number of comparisons for Average Case and Worst Case for selection sort and bubble sort? Which technique is better from these two? Why? 07

- (b) State different types of searching? What is Preconditioning? Explain Hashing functions briefly. 07

OR

- Q.5 (a) Write an algorithm for the binary search. 07

- (b) Explain Quick sort to sort the array given below in ascending order. 07

87	99	36	94	58	65	11	74	23	42
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