MCA/ M11
Data Structure Using C
Paper : MCA 201

Time: Three Hours   **Maximum Marks: 80**

Note: Attempt question no. 1 Attempt FOUR more questions selecting ONE question from each Unit- I, II, III, & IV.

1.   (i) Write an example of diagonal matrix and explain its storage in memory.
   (ii) What is a record? Write C syntax of record and explain its memory representation.
   (iii) Write the structure for linked list in C. Write memory allocation of a node of linked list.
   (iv) Write algorithm to delete an element from a queue.
   (v) Write memory representation of a complete binary tree with suitable example.
   (vi) Define B tree and write an example of the B tree.
   (vii) Differentiate between path matrix and adjacency matrix of a graph G.
   (viii) Write breath first search algorithm to find path from a node A to the node B in a graph G.
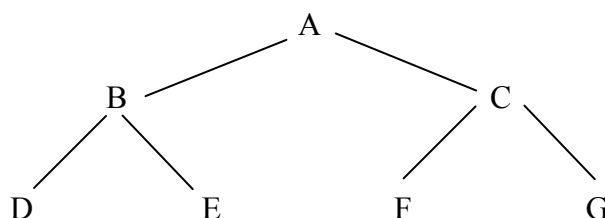
Unit-I

2. Write algorithm for insertion sort and Selection sort respectively. Which sorting technique is more efficient?
3. (a) Write algorithm to count the number of paragraphs used in a short story S.
   (b) Write algorithm to count the number of lines a pattern P exists in the text T.

Unit-II
4. (a) Write algorithm to search an element from the linked list and write the corresponding C syntax
   (b) Write advantage and disadvantage of linked list over an array.

5. Describe the structure stack and explain its use in evaluation of an arithmetic expression: 6(5+9)-8/2+7 and write algorithm for the same.

UNIT-III

6. (a) Write algorithm for pre-order traversal of a binary tree and apply the algorithm to the following tree:

(b) Define in-way search tree and write an example of the tree.

7. Write algorithm for Heap Sort and describe its complexity. Apply the algorithm to sort following numbers: 58, 38, 69, 99, 44, 77, 33.

UNIT-IV

8. Write algorithm to find in-degree and out degree for each node of a Digraph D. Apply the algorithm to the digraph:
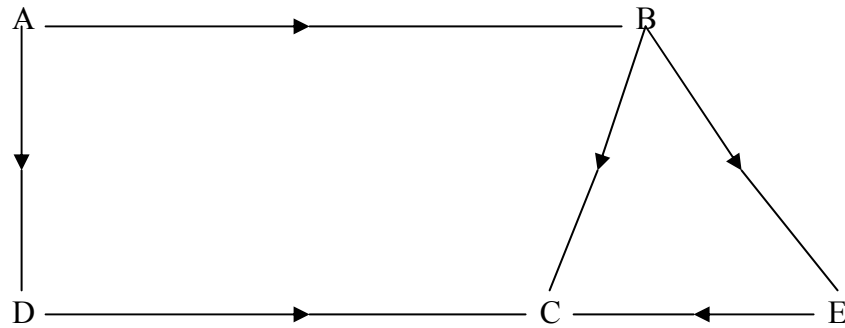
9. Write algorithm to insert an edge in a graph G Explain the algorithm with suitable example.