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BCACAC 210

Credit Based Third Semester B.C.A. Degree Examination, Oct./Nov. 2016
(Common to All Batches)
DATA STRUCTURES

Time : 3 Hours

Max. Marks : 80

Note : Answer any ten questions from Part – A and one full question from each Unit of Part – B.

PART – A

1. a) Define data structures. List different types of data structures. (10×2=20)
- b) Evaluate the postfix expression $AB-CDE^{^}/$ where $A = 5, B = 1, C = 3, D = 4$ and $E = 2$.
- c) What is sparse matrix ? Give example.
- d) Give advantages of linked list over arrays.
- e) What do you mean by traversing a linear array ?
- f) Define path and leaf node in a tree.
- g) Write the steps of inorder traversal of a binary tree.
- h) Define complete and labelled graph.
- i) What is a binary search tree ? Give an example.
- j) Write any dynamic memory allocation functions available.
- k) Mention any two applications of a stack.
- l) Define adjacency matrix.

PART – B

Unit – I

2. a) Explain algorithmic notations for selection control structure.
- b) List and explain any four operations performed on linear data structures.
- c) Write an algorithm to find a number using binary search. (5+5+5)
3. a) Write a note on strings as ADT.
- b) Explain sub-algorithm with an example.
- c) How to represent polynomial using an array ? Explain with an example. (5+5+5)

**Unit – II**

4. a) Sort the following numbers using selection sort method 11, 2, 12, 8, 6, 7, 4, 3, 90, 55, 44.
b) Write an algorithm to search for a given element in a singly linked list.
c) What is a linked list ? Explain different types of linked lists with neat diagram. (5+5+5)
5. a) Write algorithm to insert a node at the beginning of a linked list.
b) Explain with an example to sort the numbers using insertion sort.
c) Explain with a figure to delete a node from a doubly linked list. (5+5+5)

Unit – III

6. a) Write the algorithms to perform PUSH and POP operations on stacks using arrays.
b) Evaluate the following postfix expression
i) 100, 40, 8, +, 20, 10, -, +, *
ii) 5, 6, 9, +, 80, 5, *, -, +
c) List the properties of recursive functions. Write a recursive algorithm to find the factorial of a number. (6+5+4)
7. a) Write the algorithm to evaluate postfix expression.
b) Write the diagram of linked representation of queue. Write an algorithm to insert a node into a queue using linked list.
c) Write a note on circular queues. (5+6+4)

Unit – IV

8. a) Write breadth first search traversal algorithm for a graph with an example.
b) Write an algorithm to search a node in binary search tree.
c) Explain binary search tree with an example. (6+4+5)
9. a) Draw the binary search tree for the following list of numbers and traverse it in preorder, postorder and inorder : 40, 60, 50, 33, 55, 11.
b) Write an algorithm to insert a new node containing information N into the graph G.
c) Explain linked list representation of a binary tree with an example. (5+5+5)