NB-101

November-2013

B.C.A., Semester-III

Theory Examination

CC-202 : Data Structures

Time : 3 Hours]   **[Max. Marks : 70**

1. (A) Answer the following : (any **two**)   **8**

    (1) Explain classification of data structure with proper diagram.

    (2) A two dimensional array A [-3..0,-2..2] is stored in row major order. Answer the following :

       (i) What is the size of Array A ?

       (ii) Find the memory location of A [-1][-1] where starting location is 1200 and word size is 4.

    (3) Explain types of linked list with proper diagram.

    (4) Write algorithm to insert an element at the end of the Doubly Linked list.

    (B) Answer the following : (any **two**)   **6**

    (1) Give at least four comparisons between array and linked list.

    (2) Explain Binary Search algorithm in detail. Also give differences between Sequential Search and Binary Search Method.

    (3) Write a short note on Merge sort Method.

    (4) Write an algorithm for Selection sort Method.

2. (A) What is a Stack ? Explain all operations and applications of stack in detail.   **7**

    OR

    Convert the following infix expressions to postfix expression :

    (a) (A + B * C) * D – (E / F * G)

    (b) A + B – C * D / E

    (B) Write a short note on Types of Queue.   **7**

    OR

    Write an algorithm to insert an element into and to delete an element from simple queue.
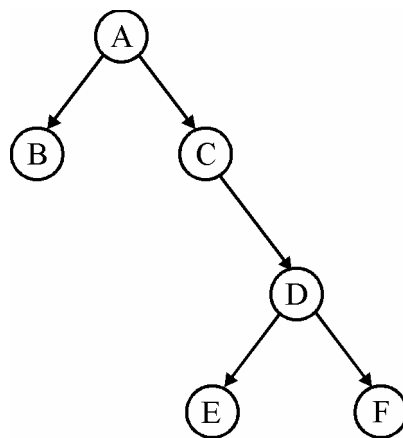
3. (A) Answer the following : (any **two**) **8**

    (1) Define the following :

        (i) Root

        (ii) Leaf Node

        (iii) Height of tree

        (iv) Sibling of a node

    (2) Write a short note on Threaded Binary Tree.

    (3) Explain AVL tree in detail.

    (4) Give in-order, Pre-order and Post-order traversal of following Binary tree :

(B) Answer the following : (any **two**) **6**

    (1) Draw Expression tree for ((A + B * C) / D) – E / F

    (2) Draw B tree of order 3 for following data :

        10,6,23,12,3,29,33,11,5

    (3) Explain BST in detail.

4. (A) Explain different representations of graph along with Breadth First Search Method. **7**

<div align="center">OR</div>

Write a short note on Depth First Search Method with algorithm and Tracing.

(B) Explain Prim's Algorithm with proper example. **7**

<div align="center">OR</div>

Write a short note on Kruskal's Algorithm with proper example.

5. Answer the following : **14**

    (1) Which one of the following is example of Primitive Data Structure ?

        (a) int   (b) array

        (c) stack   (d) none of above

    (2) What is the size of array A [-1:N] ?

        (a) 2N   (b) –N

        (c) N   (d) N+2

    (3) Which one of the following statement is correct for linked list ?

        (a) Linked list is using dynamic memory allocation.

        (b) There are three types of linked list.

        (c) Both (a) and (b)

        (d) None of (a) or (b)

    (4) Which one of the following statement is correct for Sequential Search Method ?

        (a) Sequential Search Method can be applied on unsorted data table.

        (b) Data table must be in order before searching element.

        (c) Both (a) and (b)

        (d) None of (a) and (b)

    (5) Which one of the following is not valid operation of Stack ?

        (a) PUSH   (b) POP

        (c) PEEP   (d) DISPLAY

    (6) In _____ type of Double Ended Queue, insertion from both the end is possible while deletion is possible from only one end.

        (a) Input Restricted Dequeue

        (b) Output Restricted Dequeue

        (c) Both (a) and (b)

        (d) None of (a) and (b)

    (7) What is the order of traversal for In-Order Traversal Method ?

        (a) RIGHT, ROOT, LEFT

        (b) LEFT, ROOT, RIGHT

        (c) RIGHT, LEFT, ROOT

        (d) LEFT, RIGHT, ROOT

(8) Tree is _____ type of graph.

    (a) Cyclic   (b) Mixed

    (c) Acyclic   (d) None of above

(9) In linked list representation of Binary Tree, if there are N node then total NULL links will be _____.

    (a) N–1   (b) N

    (c) N+1   (d) N+2

(10) In complete Binary Tree of height h, total number of nodes will be _____.

    (a) 2h   (b) h+2

    (c) 2^h+1   (d) H^2+1

(11) Which one of the following is not correct statement ?

    (a) Path is always a cycle

    (b) Path never be cycle

    (c) Both (a) and (b)

    (d) None of (a) and (b)

(12) Graph G is called Multi graph if,

    (a) Graph G is having at least one parallel edge

    (b) Graph G is having at least one cycle

    (c) Graph G is undirected graph

    (d) None of above

(13) How many maximum passes are required in Bubble Sort Method for N elements ?

    (a) 2N   (b) N-1

    (c) N+1   (d) N

(14) Prefix expression of infix (A+B) * C is _____

    (a) ABC*+   (b) ABC+*

    (c) AB+*C   (d) None of above

_____