DB-101

December-2018

B.C.A., Sem.-III

CC-202 : Data Structures
(Old & New Course)

Time : 2:30 Hours]   **[Max. Marks : 70**

1.   (A)   Answer the following :

        (1)   Write an algorithm to insert an element at beginning and delete an element from end in a doubly linked list.   **7**

        (2)   Explain selection sort technique with example. Also write an algorithm to sort an array elements using selection sort.   **7**

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

        (1)   What is linked list ? List out types of linked list. Explain structure and representation of doubly linked list with example.   **7**

        (2)   Explain binary search technique with example. Also write an algorithm to search an element in array using binary search technique.   **7**

   (B)   Do as directed. (Any **Four**)   **4**

        (1)   Give the difference between array and linked list.

        (2)   Write Formula to find address of the element in one dimensional array.

        (3)   Define data structure.

        (4)   Draw the classification of data structure.

        (5)   What is sparce matrix ?

        (6)   For Linear search, elements _____ order in the list.

           (a)   must be stored in sorted

           (b)   must be stored in unsorted

           (c)   may be stored in sorted or unsorted

           (d)   none of these

2. (A) Answer the following :

   (1) Show the stack status after each operation in the conversion of following expression to postfix :   A + (B * C – (D/E – F) * G) *H   **7**

   (2) Write an algorithm to insert and delete an item from a queue using linked list.   **7**

OR

   (1) What is queue ? List out types of queue. Explain Insert and Delete operations of circular queue with example.

   (2) Write an algorithm for push, pop and peep operations of stack.

(B) Do as directed. (Any **Four**)   **4**

   (1) List out stack notations.

   (2) Stack is_____ data structure.
       (a) FIFO
       (b) FCFS
       (c) LIFO
       (d) None of these

   (3) Define priority queue.

   (4) Write any two applications of stack.

   (5) _____ is very useful in situation when data have to be stored and then retrieved in reverse order.
       (a) Stack
       (b) Queue
       (c) Linked list
       (d) None of these

   (6) Which data structure allows inserting and deleting data elements at either end ?
       (a) Deques
       (b) Queue
       (c) Circular queue
       (d) None of these

3. (A) Answer the following :

    (1) Explain one-way and two-way threaded binary tree with example. **7**

    (2) Write steps to create expression tree. Create an expression tree for following expression. $(M-N)* Z + P/(X + Z)$ **7**

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

    (1) What is Binary tree ? Write algorithms for in-order, pre-order, and post-order traversals of binary tree.

    (2) Write steps to create binary search tree. Create binary search tree with the following data :

        25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66, 90

(B) Define following terms : (Any **Three**) **3**

    (1) Complete binary tree

    (2) Leaf node

    (3) Root node

    (4) Sibling

    (5) Degree of a node

4. (A) Answer the following :

    (1) Write algorithm for Breadth first search traversal. Explain Breadth first search with example. **7**

    (2) Explain Dijkstra's algorithm with proper example. **7**

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

    (1) What is minimum spanning tree ? Write Kruskal's algorithm. Find the minimum spanning tree using Kruskal's algorithm.
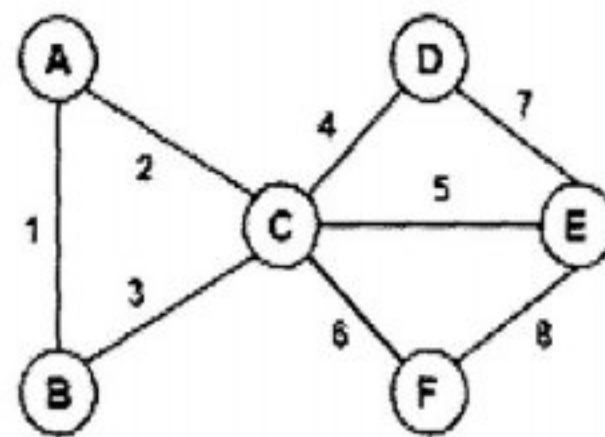
    (2) What is graph ? Explain different representations of graph with example.

(B) Do as directed. (Any **Three**)   3

    (1)   Define Multi-graph.

    (2)   Which node has zero degree ?

        (a)   Source

        (b)   Sink

        (c)   Isolated

        (d)   None of these

    (3)   Give full form of MST.

    (4)   ____ is a non-linear data structure.

        (a)   Stack

        (b)   Graph

        (c)   Queue

        (d)   None of these

    (5)   A directed graph that has no cycles is called _____.

        (a)   Acyclic graph

        (b)   Multi graph

        (c)   Complete graph

        (d)   None of these

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