DE-125

December-2013

5 Years M.Sc. (CA & IT) Integrated (KS) 3rd Sem. S.Y. M.Sc.

Data Structures

Time : 3 Hours]   **[Max. Marks : 100**

1. (a) Write algorithm to count the total elements in a stock and display the elements. **5**

   (b) Convert the following expression from infix to post fix. **6**
   (1) (A – B) * (D / E)
   (2) (A + B) / (E + F) + G

   (c) Consider the following stack of characters, where stack is allocated N = 8 memory cells. **9**
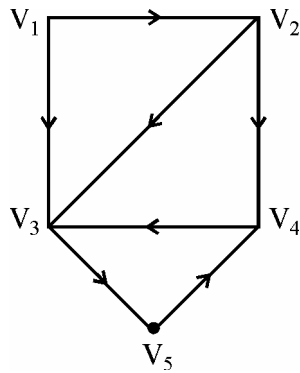   Stack : <u>A</u>, <u>C</u>, <u>D</u>, <u>F</u>, <u>K</u>, __, __, __
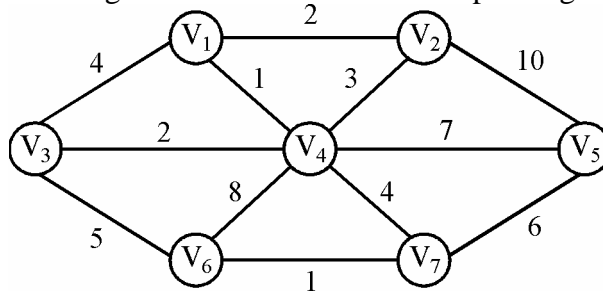   Describe the stack as the following operations take place :
   (1) Pop (stack, item)
   (2) Pop (stack, item)
   (3) Push (stack, L)
   (4) Push (stack, P)
   (5) Pop (stack, item)
   (6) Push (stack, R)
   (7) Push (stack, S)
   (8) Pop (stack, item)
   (9) Pop (stack, item)

2. (a) Explain queue, deque and priority queue. **5**

   (b) Let LIST be a linked list in memory. Write an algorithm for the following : **10**
   (1) Find the number of times a given ITEM occurs in LIST.
   (2) Find the number of non zero elements in LIST.

   (c) Write an algorithm to delete a node with a given location in a two-way linked list. **5**

3. (a) Write an algorithm to count total number of modes in a binary tree. **8**

   (b) Define : Branch **2**

   (c) Create a binary tree from the given traversals : **10**
   Preorder : G B Q A C K F P D E R H
   Inorder : Q B K C F A G P E D H R

4. (a) Consider the directed graph G given below : **6**

(1) Find indegree and outdegree of V_3.

(2) Are there any source or sinks ? If yes, identify them.

(3) Find the path matrix P.

(b) Define the following : **4**

(1) Minimum Spanning tree.

(2) Complete Graph.

(c) Answer the following : **6**

(1) What is the use of Warshall's algorithm ?

(2) Define : Tree graph.

(3) Explain the difference between closed and simple graph.

(d) Apply Kruskal's algorithm and find minimum spanning tree. **4**

5. (a) Sort the following numbers using bubble sort. **10**
56, 2, 40, 32, 5, 96, 98, 60, 12

(b) Write algorithm/program for binary search. **5**

(c) Write algorithm for insertion sort. **5**

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