07/10/22

VCD SYIT SEM-III DATA STRUCTURES 75 MARKS $2^{1/2}$ HOURS

NOTE: 1) All Questions are compulsory.
2) Figures to the right indicate full marks.

Q.1. Attempt any three [15]

a) How the data structures are classified? Explain in detail.
b) What is sparse matrix? Explain different types of sparse matrix.
c) Consider 3-dimensional array 'A' whose subscript limits are 1<=i<=8, -2<=j<=3, 3<=k<=6. Assuming the base address of array is 2000 and each element of array occupies 2 memory cells. Calculate the address of element A[3,0,5].
d) Write an algorithm for binary search in an array.
e) Differentiate between linear search and binary search.
f) What do you mean by complexity of an algorithm? Explain its types.

Q. 2. Attempt any three [15]

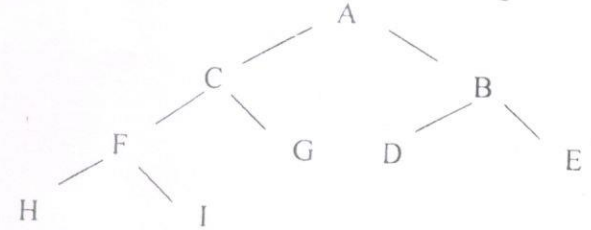
a) Explain Linked List and its different types.
b) Write an algorithm to insert an element in linked list at the beginning.
c) Write an algorithm to add node at beginning of single linked list along with representation.
d) Explain different categories of header linked list.
e) Write short note on traversing in linked list.
f) Explain Circular Linked List-Organization and Operation in detail.

Q. 3. Attempt any three [15]

a) Write an algorithm for push and pop operation of the stack.
b) Write an algorithm to insert element in queue.
c) Evaluate postfix expression for given expression using stack representation.
i. (5 + 3) * (8 – 2)
d) Explain priority queue in detail.
e) Convert following expressions:
i. infix to postfix A / B + C * D ii. infix to prefix (A + B) / (C - D)
f) What is recursion? State its properties.

Q. 4. Attempt any three [15]

a) Explain the following terms regarding trees:
i.Root ii. Path iii.Parent Node iv.Degree of Node v. Level of tree
b) Explain preorder, inorder and postorder of following tree:



c) Examine the technique to produce Huffman Tree and Huffman Codes for following text DABCADEABADCBAD
d) Arrange the list 26,54,93,17,77,31,44,55 in ascending order by using bubble sort. Write down step by step process.

e) Binary tree T has 9 nodes. Generate the binary tree according to inorder and postorder of tree.

Inorder : EFCKAHDBG

Postorder : DGHBFKECA

f) Create a heap for the given elements 25 17 10 20 22 15 28.

Q. 5. Attempt any three [15]

a) Explain following:

i. Linear Probing ii.Double Hashing

b) Explain following graph terminology:

i.Hamiltonian path

ii.Weighted graph

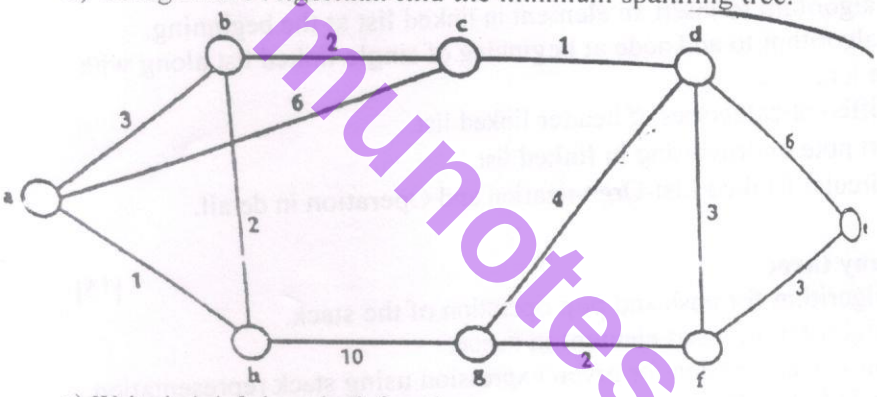
iii.Multigraph

iv.Connected graph

v.Directed graph

c). Write and Explain the algorithm for Breadth-First Search (BFS) in a graph.

d) Using Prim's Algorithm find the minimum spanning tree.



e) Write in brief about hash function.

f) Explain Depth First Search algorithm with implementation..

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