DSA Suggestions

Array

(1) (a) Let the size of the elements stored in a matrix $A[8][3]$ 6e 1 6ytes. if base address 3500, find address of $A[5][2]$ in Row and column order.

(b) What are 5 essential properties of algorithm $(2+3)$ $(4)+(5)$

(2) Define the term array, How 2 d arrays are stored in memory $(1+4)$

(3) Represent 3 Tuple Form, What is sparse matrix? $(1+1)$

(4) What is an Abstract data type? Differentiate linear vs Non Linear data structure $(2+3)$

Stack

(5) Describe the algorithm to evaluate postfix expression (5)

(6) Describe the algorithm to convert infix to postfix (5)

(7) Evaluate the postfix expression   (5)

$$3 \; 1 + 2 \wedge 7 \; 4 - 2 * + 5 -$$

(8) Convert the infix expression in Postfix   (5)

$$9 + 5 * 7 - 6 \wedge 2 + 15/3$$

(9) Define Stack. write push() and pop() function $(1+2+2)$

Queue

(10) Write algorithm to delete an element in linear queue (5)

(11) Write algorithm to insert an element in circular queue (5)

(12) Write algorithm to display an element in circular queue (5)

(13) Write algorithm to insert an element in linear queue (5)

(14) What is Priority Queue]   (2)

Linked List

(15) Write algorithms to do the following operations on singly linked list.

    (i) insert a node beginning   (5)
    (ii) insert a node at end   (5)
    (iii) delete a node at beginning   (5)
    (iv) delete a node at end   (5)
    (v) search a node   (5)
    (vi) count number of nodes.   (5)

(16) Write algorithms to merge two sorted linked list   (5)

Tree

(1) What is Binary search tree?
Make a BST for the following sequence
    45, 36, 76, 23, 89, 115, 98, 39, 41, 56, 69, 48
Traverse the tree in Preorder, inorder, Postorder   (2+4+3)

(2) Represent the following expression ~~Preorder, Inorder~~
in expression tree,
show the preorder, inorder and postorder   (3+3)

(3) Construct a binary tree whose nodes
inorder: 10, 15, 17, 18, 20, 25, 30, 35, 38, 40, 50   (5)
preorder: 20, 15, 10, 18, 17, 30, 25, 40, 35, 38, 50

(4) Inorder Traversal : E I C F J B G I D K H L A
Preorder " : A B C E I F J D G H K L   (4+1)
Draw the tree and write postorder

(5) Inorder Traversal : H D B E F A F J C K G L
Postorder Traversal: H D I E B J F K L G I C A   (4+1)
Draw the tree and write preorder.

(6) ~~Construct~~ What is AVL Tree?
construct AVL Tree inorder below   (1+4)
    3, 5, 11, 8, 4, 1, 12, 7, 2, 6, 10, 9

(7) Define Balance Factor   (1)

~~Suppose a binary search tree with 1000 distinct elements is~~ also complete binary tree

(8) What is the condition of Balance Factors to make a AVL tree?

Explain 4 types of rotation in AVL Tree   (3+6)

Graphs :→

(1) Define Graph.
Why graph is called Non linear data structure?
~~What are~~ Explain adjacency Matrix
Explain adjacency List with a example graph   (1+2+6)
or given graph

(2) Draw a picture of a directed graph
$G1 = (V, E)$
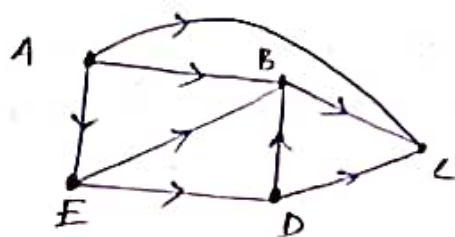$V(G1) = \{1, 2, 3, 4, 5, 6\}$
$E(G1) = \{(1,2), (2,3), (3,4), (5,1), (5,6), (2,6), (1,6), (4,6),(2,4)\}$
Obtain adjacency matrix of the graph   (5)

(3) Explain DFS and BFS according to the graph, consider a as source.

~~[crossed out diagram]~~
(3+3+2)

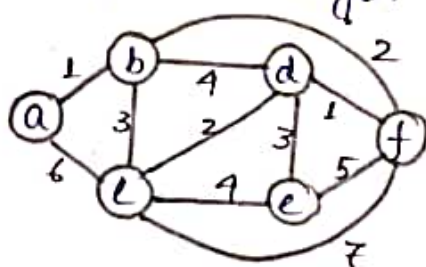What is Pendant Vertex?

(4) Differentiate Prim's and Krushkal algorithm
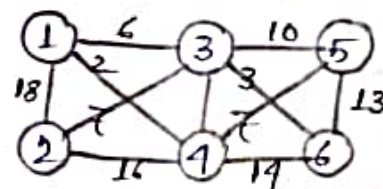Write down complexities of those   (4+2)

(5) Find Minimal cost spanning tree using prim's algo.   (7)

(6) Find Minimal cost spanning tree krushkal algo.   (7)

Sorting

(1) Take a set of integers:
   19, 16, 15, 11, 31, 8L, 12, 20 ; show the steps using

   (i) Merge sort   (iv) Selection sort   (6×5=30)
   (ii) Quick sort   (v) Bubble sort
   (iii) insertion sort

(2) Case study of best, worst and average time complexities
   in every sort   (5)

(3) Write the algorithm of insertion sorts.   (5)
                               Selection sort   (5)
                               Bubble sort   (5)

Hashing

(1) Define Hashing. What do you mean by hash table and hash function. Explain 3 hash functions used with example (3+6)

(2) What is collision?
   What are the types of collision resolution techniques in open addressing. Explain with example.
   What is the chaining method of collision resolution. (2+6+4)
                                              explain

(3) The keys 12, 18, 13, 2, 3, 23, 5, 15 are inserted into an initially empty hash table of length 10 using open addressing with hash function $h(k) = k \mod 10$ and linear probing.
   What is the resultant hash table?   (5)

Miscellinous

(1) Write a c program two add two polynominals
   $10x^5 + 25x^3 + 20x + 50$ and $12x^5 + 15x^4 + 2x^2 - 5x + 30$
                              (use array or linked list) (5)

(2) Write a C program to print the 100th Fibbhacci Number (5)

Study More!

- B-Tree
- Space and time complocity
- What is DS and A of DS A, Explain.
- And More and More and More

Study Well!!!