# DSA IMP QUESTIONS

**CAHPTER 1**

(1)Define the term 'data structure' Explain how data structure are useful in solving various problems

(2) Explain primitive and non-primitive data types with example.

(3) Explain time and space anaylisis of algorithms with example.

(4) Explain asymptotic notation regarding complexity of an algorithm( $(\Omega, \Theta, O)$ )

(5) Explain best case,average case and worst case time analysis with example.

(6)Write a short note on time complexity of anlgorithm.

**CAHPTER 2**

(1)Briefly explain various linear data structure along with their applications.

(2)What is stack? List out different operation of it and write algorithm for any two operation.

(3)Explain through algorithm how stack can be used to RECOGNIZE the palindrome strings of odd length.

(3) Explain algorithm of reverse polish notation.

(4) Convert given infix string to postfix notation using stack (a+b^c^d)*(e+f/d).

(5)Convert given infix string to postfix notation using stack a+b*c-d/c*h.

(6)Convert given infix string to postfix notation using stack a*(b+(c+d)*(e+f)/g)*h

(7) Convert given infix string to postfix notation using stack ab-cde+*+fg+-

(8)Translate the following string into polish and trace the content of stack a-(b/c+(d%e*f)/g)*h

(9)(((a/(b^c))+(d*e))-(a*c)) convert from infix to postfix from by showing stack implementation and then put the values a=27,c=2,e=17,d=3,b=3.

(10) Convert following infix string to postfix notation using stack

(i)a+(((b-c)*(d-e)+f)/g)$(h-j)

(ii)(a+b$c$d)*((e+f)/d)

(11) Write a recursive algorithm to find the factorial of given number.Explain through example which data structure is used to handle the recursive calls.

(12) Trace the algorithm showing stack to calculate the factorial of n=5.

(13) Trace the algorithm showing stack to solve the tower of Hanoi problem for n=3.

(14)Explain tower of hanoi with algorithm.

(15)Explain following queue(i)DQUEUE (ii) circular queue (iii) priority queue..

(16) Write algorithm for performing an insertion and a delection in circular queue and trace the operations using appropriate data

(17) Write a algorithm for performing an insertion and a deletion from an input-restricted double-ended queue and trace the operation using appropriate data.

(18)What is priority of queue?Explain the array representation of priority queue.

(19)Explain priority queue in detail with management of priority queue data after insertion and deletion operations on it.

(20)Compare:(1)Linked-list and Array(2)Circular queue and Simple queue.

(21)Write an algorithm to insert node in a linear singly link list.

(22)Write a algorithm to insert and delete an element after a given node in singly linked-list.

(23)Explain circular linked list with the significance of the HEAD node.

(24)Write the algorithm of insert and delete operations for doubly linked list.

(25)Explain the application of stack,queue and linked list in detail.

**CAHPTER 3**

(1)Briefly explain various non-linear data structure along with their applications

(2)Explain Depth first search and breadth first search in graph with an example.

(3)Explain AVL tree with example

(4)Genrate a binary search tree for following numbers and perform in order and post-order traversals:7,4,2,3,6,5,12,9,8,11,19,15,20

(5)What is binary search tree?Create a binary search tree for inserting the following data 13,3,4,12,14,10,5,1,8,2,7,9,11,6,18.

(6)Construct AVL tree from the following data:54,78,92,86,37,12,9,23,26,35,43,76,51

(7)Insert the following nodes in AVL (Height balanced)tree.

(8)Write short note on BFS and DFS in graph.

(9)Insert the following nodes in AVL tree.

January to December

(10)What is grapg?discuss the application of a graph.

(11)Write short note on Threaded binary tree.

(12)Write answer for following operations with respect to BST

(i)construct BST for data 52,27,62,26,22,45,97,33,16,49,35,88

(ii)Reconstruct tree of operation-(i) output by performing operations:

(a)Node 90 is added (b)Node 26 deleted.

(13)Given the following traversals create a binary tree from that.also give the postorder traversal for the same.

Preorder = {7,10,4,3,1,2,8,11}

Postorder= {4,10,3,1,7,11,8,2}

(14)Construct the inorder threaded binary tree from the binary tree shown in below figure 1.

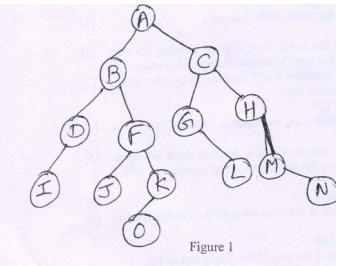


Figure 1

(15)Write inorder,preorder and postorder traversal of the binary tree shown in above figure 1.

(16)Write the Breadth First Search(BFS) and Depth First Search(DFS) traversals of the graph shown in below figure 2.

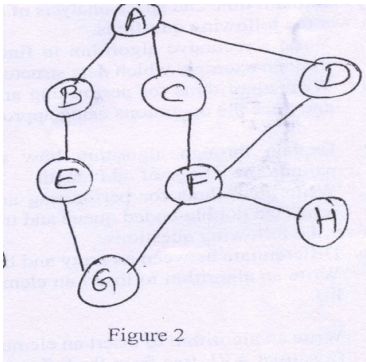


Figure 2

(17)Write recursive algorithms of inorder,preorder and postorder traversals,Derive all traversal sequences of binary tree shown in below fig 2

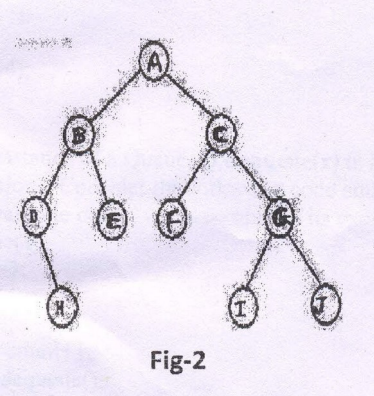


Fig-2

(18)Insert 38,75,85,15 in the AVL TREE shown in fig 3.draw rebalancing of tree after every insertion.

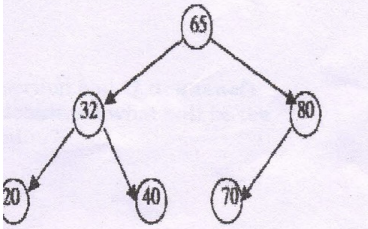


Fig- 3

(19)Write steps to convert the general tree to binary tree to binary tree.also convert the general tree shown in below fig 4 to binary tree.

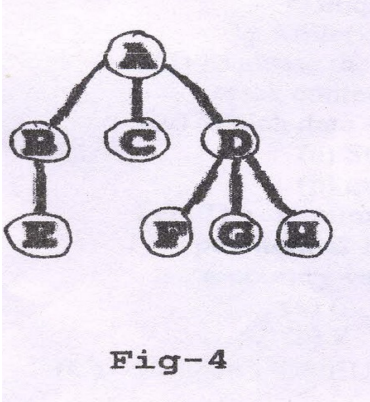


Fig-4

(20)Write an algorithm of BFS and DFS.traverse the graph shown in below fig 5 using both methods.

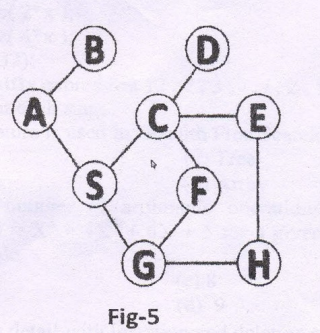
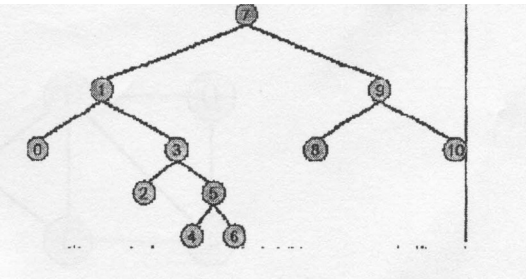
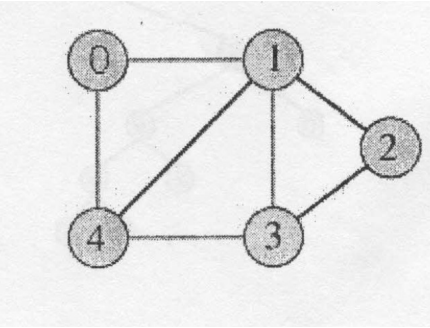


Fig-5

(21)Give traversals order of following tree into inorder,preorder and postorder.



(22)Show the possible adjacency matrix and adjacency list representation for the following graph:




**CAHPTER 4**

(1)Explain the difference between insertion sort and selection sort with an example.what is the time complexity of these algorithms?How?

(2)Write an algorithm for insertion sort and explain using example.

(3)sort the list 35,20,40,100,3,10,15 using insertion sort method.

(4) Explain the trace of bubble sort on following data

42,23,74,11,65,58,94,36,99,87

(5)Sort the following data using quick sort algorithm(trace all the steps).

34,90,21,43,87,2,67,53,9,23,82

(6) sort the numbers 77,12,8,39,27,21,44,18,6,47,11,37,60,56 using Quick sort

(7)A=(38,81,22,48,13,69,93,14,45,58,79,72).sort the given array by using Quick sort algorithm.

(8)Explain the trace of merge sort on following data

42,23,74,11,65,58,94,36,99,87

(9)Write an algorithm for merge sort and explain using example.

(10)sort the numbers 77,12,8,39,27,21,44,18,6,47,11,37,60,56 using Heap sort by showing status of data structures at each step.

(11) Sort the following data using radix sort algorithm(trace all the steps).

134,790,321,43,287,2,67,353,339,423,282

(12)Explain linear search algorithm with example.

(13) Explain binary search algorithm with example.

(14)Write an algorithm to perform binary searching.

(15)Write an algorithm of binary search.show the trace to search x=55 from sequence of data 15,23,38,51,55,62,88.

**CAHPTER 5**

(1)List out different hash methods and explain any three methods.

(2)Given the key inputs 4322,1334,1471,9679,1989,6171,6173,4199 and the hash function h(key)%9.Draw the memory allocation table along with resolution of collision (ifany) using Linear probing.

(3)What do you mean by hashing?Explain any three hashing techniques.

(4)What is hashing?Explain any one collision-resolution technique.

**CAHPTER 6**

(1)Explain how a polynomial can be represented using sequential storage representation and linked storage representation.

(2)Explain the structure of the indexed sequential files

(3)Explain sequential,indexed,sequential and random file organizations.

**DEFINATIONS**

(1)Data Structure (2)Sparse Matrix (3)Recursion (4)Primitive data type (5)Circular Linked list (6)Depth of tree (7)strictly binary tree (8)Ancestor nodes (9)Graph (10)Minimum spanning tree (11)Path (12)Cycle (13)Degree of vertex (14)Sibiling (15)Height balanced tree (16)Strictly binary tree (17)in degree