ARYA COLLEGE OF ENGINEERING
DSA GUESS PAPER
(B. Tech III Semester2024-25)

3CS4-05: Data Structure & Algorithms

Unit 1
Short
Questions

1. What is data structure? How you will classify it?
2. What do you understand with asymptotic notation? Explain in detail.
3. What is algorithm? Explain its characteristics in detail.
4. Give Algorithm for reversing list and factorial calculation
5. Explain multi-stack implementation using single array.
6. Write difference between array and stack and Queue?

Descriptive Questions

1. Define Stack and its applications. Explain its basic structure and its operations and implement a stack using Dynamic array.
2. Can the Tower of Hanoi problem solve using recursion? Explain by taking an example.
3. Explain Algorithm for Multiple stack implementations using single array?
4. How to perform factorial calculation using stack ? Explain
5. (a)Convert this infix in to postfix and prefix: A*(B/C*D)+E
   (b)Evaluate this Postfix expression: 729*+

Unit 2
Short
Questions

1. Write difference between Queue and Linked list?
2. How will you use Linked List for multiplication of polynomials?
3. Explain round robin algorithm by taking an example.
4. What are Advantages and Disadvantages of Linked List
5. Represent priority queue by linked list &Array
6. What are applications of Queue and Linked list

Descriptive Questions

1. Write an algorithm to Enqueue and Dequeue in Circular Queue
2. Write an algorithm to Enqueue and Dequeue in Circular Linked List
3. Create the linked list to represent the following polynomials-
   $5x^5 + 4x^4 + 6x^2-4$
   $8x^6+4x^4+3x^3+2x^2+x$
   Write a function add () to add these polynomials and print the resultant linked list.
4. Write an algorithm to Implement Queue using Stack
5. Discuss Head node in linked List with suitable Example

6. What is doubly linked list? Explain the algorithms for inserting a node and deleting a node from a doubly linked list.

Unit 3
Short Questions
1. Write Difference among Bubble sort, insertion sort and Selection sort.
2. Write Difference between Merge sort and Quick sort.
3. Explain Time Complexity among all the Sorting Techniques
4. What is Heap sorting? Define Time Complexity
5. Write algorithm of Counting Sorting
6. What is sorting? What is Time Complexity for Insertion Sort and Selection Sort
7. Explain binary search by taking an example

Descriptive Questions
1. Sort the following data in ascending order using Quick sort:9,4.12,6,5,10,7
2. Write an algorithm for merge sort and comment on its complexity
3. What is difference between internal sorting and external sorting?
4. Write short note on Radix Sort ?
5. Write algorithms to sort real numbers using insertion sort and selection sort.
6. Write algorithm for Bubble sort. Sort the following list by your algorithm:-
73, 49, 53, 12,48,10,84,70,20,16
7. Explain Count Sort algorithm by taking an appropriate example.

Unit 4
Short Questions
1. Explain following:
   a) Terminology used in Tree
   b) B Tree
   c) Complete Binary Tree
   d) Extended Binary Tree.
2. Howa binary tree can be represented in memory. Explain with example.
3. Explain Binary Search Tree and its disadvantage.
4. What are different tree traversing approaches? Explain the need of threading
5. Suppose a binary tree T is in memory write a recursive procedure which finds the depth Dp of T.
6. The In-order and pre-order traversal sequence of modes in a binary tree are given below
   In-order: Q, B, K, C, F, A, G, P, E, D, H, R
   Pre-Order: G, B, Q, A, C, K, F, P, D, E, R, H

Descriptive Questions
1. Construct B Tree of order (2-3tree) by inserting the following keys in the order shown into an empty B-tree.
   M,Q,A,N,P,W,X,T,G,E,J
2. What do you understand with AVL Tree? Create an AVL tree from the given set of values:
   H,I,J,B,A,E,C,F,D,G,K,L
3. Write down the algorithm for INORDER traversal of a tree.
4. Write down the algorithm for POSTORDER traversal of tree

5. Write down the algorithm for inserting an element in to B-Tree

6. What is threaded binary tree ? Explain the advantages of using a threaded binary tree.

Unit 5
Short
Question
s

1. What is the difference between tree and graph? Can a tree be graph? Justify.
2. Mention the purpose of B+ Tree ?
3. How you will categories graph. Explain
4. Explain the linked representation of a grape
5. Why we use hashing. What are the different methods to evaluate hash function?
6. What do you understand with minimum spanning tree? What are different algorithms used to find minimum spanning tree

Descriptive Questions

1. Explain BFS algorithm with the help of example
2. Explain DFS algorithm with the help of example.
3. Explain Kruskal's algorithm with the help of example
4. Explain Prims algorithm with the help of example
5. Explain Dijkstra's algorithm to find the shortest path for following graph
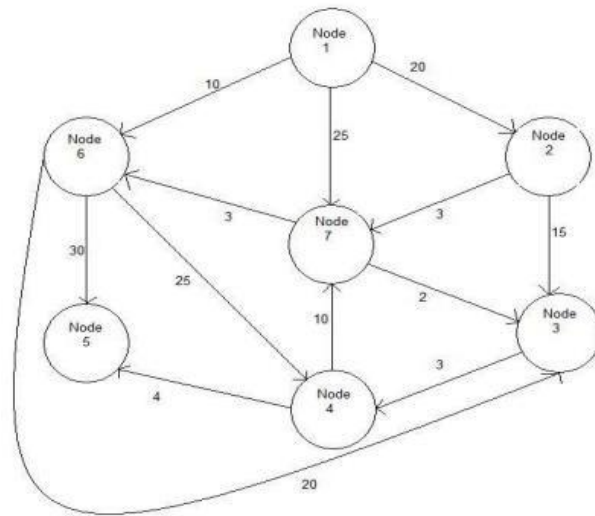
6. What do you mean by hashing and collision ? Discuss the advantages and disadvantage of hashing over other searching techniques.

SOMEI MPORTANTPROGRAMS:

❖ WAP to implement Singly Linked List and do all operations on it.
❖ WAP to implement Quick Sort.
❖ WAP to implement Merge Sort.
❖ WAP to add polynomials using linked list.