

Question Bank
CS2201-Data Structures
Unit 1

PART A

1. Define ADT.
2. What are the advantages of Linked List over arrays?
3. What are the advantages of doubly Linked List over singly linked list?
4. List the applications of List ADT.
5. List the applications of Stack and Queue.
6. What is Deque?
7. Convert the infix expression $(a+b*c-d)/(e*f-g)$
8. What is circular queue?
9. Write a routine to return the top element of stack.
10. What is the working principle of Radix sort?
11. What is priority Queue?
12. What do you mean by cursor implementation of List?

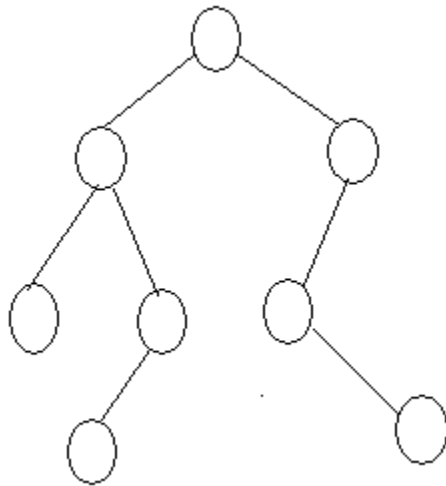
PART B

1. Explain the array and linked list implementation of Stack.
2. Explain the array and linked list implementation of Queue.
3. What are the various linked list operations? Explain
4. Write routines to implement addition, subtraction & differentiation of two polynomials.
5. Explain how stack is applied for evaluating an arithmetic expression.
6. Explain cursor implementation of list.

Unit 2

PART A

1. Compare General tree with binary tree.
2. Define the following terminologies.
Sibling, Parent, Depth, height, Level, leaf, Degree.
3. What is Full and Complete binary tree?
4. Define binary search tree.
5. Give the array and linked list representation of tree with example.
6. Define tree traversal.
7. Give the preorder, inorder and post order traversal for the following graph.



8. Draw the binary search tree for the following inputs. 70,15,29,33,44,12,79
9. Differentiate binary tree and binary search tree.
10. What is threaded binary tree?
11. Show the maximum number of nodes in an binary tree of height H is $2^{H+1}-1$
12. List the steps involved in deleting a node from a binary search tree.
13. A full node is a node with two children. Prove that the number of full nodes plus one is equal to the number of leaves in a non empty binary tree.
14. List the applications of tree.

PART B

1. Write an algorithm to find an element from binary search tree.

2. Write an algorithm to insert , delete, Find minimum and maximum element from a binary search tree.
3. What are the tree traversal techniques? Explain with an example.
4. Explain the operations performed on threaded binary tree in detail.

Unit 3

PART A

1. Define AVL tree.
2. What is binary heap?
3. What are the 2 properties of a binary heap?
4. Define B-tree.
5. What is percolating Up and percolating down?
6. What do you mean by self adjusting tree?
7. What is splay tree?
8. What is a balance factor?
9. List the applications of Binary Heap.
10. Difference between B tree and B+ tree.
11. List the different ways of implementing priority queue.
12. What is Min heap and Max heap?

PART B

1. Explain the AVL rotations.
2. Construct splay tree for the following values.
1,2,3,4,5,6,7,8,9
3. Explain the Basic operations performed in a Binary heap.
4. Construct a Min and MAX heap for the following values.
23,67,1,45,7,89,56,35
5. Write a routine to perform insertion in a B-tree

Unit 4

PART A

1. Define Equivalence relation.
2. List the basic data structures for Disjoint Set ADT.
3. What is path compression?
4. Define equivalence class.
5. Show the result of the following sequence of instructions performed by size.
Union (1,2) ,Union (3,4), Union (3,5)
6. Define hashing.
7. What is collision? What are the different collision resolving techniques?
8. What is open addressing?
9. What is extendible hashing?
10. Write a routine to perform the hash function.
11. What is hash table?
12. List the applications of SET.

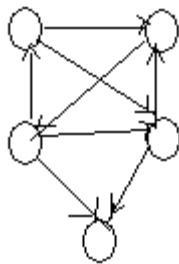
PART B

1. Define Hash function. Write routines to find and insert an element in separate chaining.
2. Explain extendible hashing to resolve collision.
3. Explain open addressing with example.
4. Write a note on Dynamic equivalence problem.
5. Write short notes on Smart Union algorithm.

Unit 5

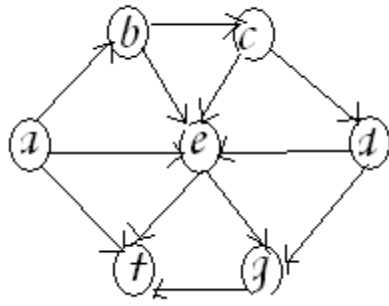
PART A

1. Define a graph.
2. Define path, degree, cycle, loop, directed graph, undirected graph, bigraph, weighted graph.
3. Define topological sort.
4. Define minimum spanning tree.
5. What is an articulation point?
6. When a graph is said to be bi connected?
7. Write the routine for Depth first and breadth first traversal.
8. List the graph traversal techniques.
9. List the applications of depth first traversal.
10. List the applications of graph.
11. What is an adjacency matrix? What are the different ways for implementing it?
12. Compare directed and undirected graph.
13. Name and find the in degree and out degree of the following graph

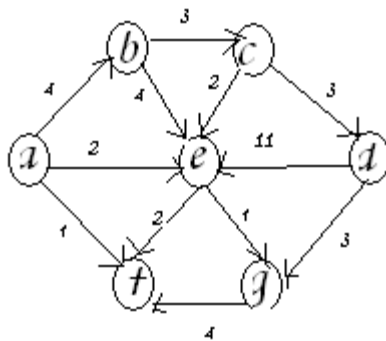


PART B

1. What is Topological sort? Write down the pseudo code to perform topological sort and apply the same to the following graph.



2. Explain Dijkstra's algorithm and find the shortest path from a to all other vertices in a graph.



3. Explain Prim's and Kruskal's algorithm. Find the minimum spanning tree for the following graph.

