VISHNU INSTITUTE OF TECHNOLOGY (AUTONOMOUS)
VISHNUPUR: BHIMAVARAM

Mid – II Examinations

Data Structures

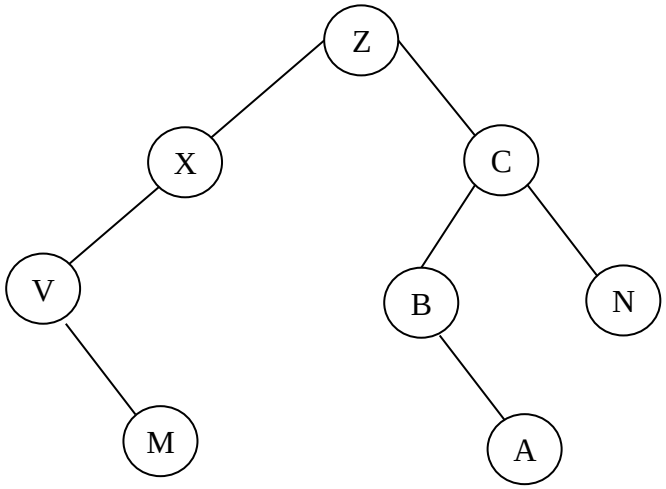
Common to AI&DS and IT

Unit-III

1. Consider a linear queue of size 5, Assume the following operations are done on the queue: Enqueue(100), Enqueue(200), Enqueue(300), Enqueue(400), Enqueue(500), Dequeue(), Dequeue( ), Dequeue( ), Enqueue(600). The elements of the queue are? **CO3-L2-[6M]**
2. Define Queue. Write algorithm for ENQUEUE,DEQUEUE operations of Queue using Arrays . **CO3-L2-[6M]**
3. Define Queue. Write algorithm for ENQUEUE, DEQUEUE operations of Queue using Linked List. **CO3-L2-[6M]**
4. Define Circular Queue. Write algorithm for ENQUEUE, DEQUEUE operations of Circular Queue. **CO3-L2-[6M]**
5. Define Double Ended Queue. Write algorithm for various operations on double Ended Queue. **CO3-L2-[6M]**

Unit-IV

1. a) Define Binary Tree. How to Represent a Binary Trees using Arrays. CO4-L2-[6M]
   b) Write algorithms for recursive Binary Tree Traversals. CO4-L2-[6M]
2. a) Define Binary Tree . How to Represent a Binary Trees using Linked List. CO4-L2-[6M]
   b) Write algorithms for non recursive Binary Tree Traversals. CO4-L2-[6M]
3. a) Write Algorithm for Binary Search Tree Search Operation. CO4-L2-[6M]
   b) What is the inorder, preorder and postorder for the following binary tree? CO4-L2-[6M]



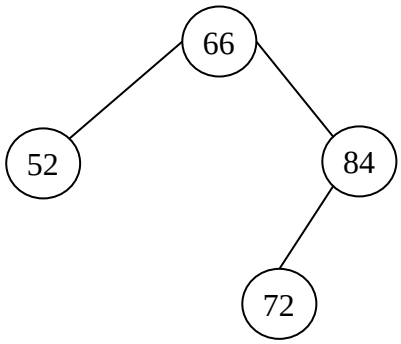
4. Construct Binary Tree for the following tree traversals. CO4-L2-[12M]

Inorder: W U R O P I T Y E

Preorder: P O U W R I Y T E

And What is the **Post order** traversal for the above constructed binary tree?

5. Consider the following Binary Search Tree and perform the following sequence of operations.



Insert the elements 89, 46, 48, 26, 76, 98, 100. Now **delete** the elements 84, 48, 52 and 66. Finally what is the root node? CO4-L2-[6M]

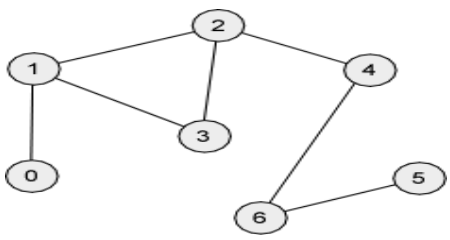
b) Write Algorithm for Binary search Tree Insertion operation. CO4-L2-[6M]

6. The *preorder* traversal sequence of a *binary search tree* is 30, 20, 10, 15, 25, 23, 39, 35, and 42. Construct the Binary Search Tree and Write the postorder traversal sequence of the same tree? CO4-L2-[12M]
7. Construct a Max heap for the following keys: 4, 67, 23, 89, 12, 8, 7, 44, 78, 64, 70.
   Apply deleteMax operation on the resulting max heap. And write algorithm for insertion operation in Max Heap. CO4-L2-[12M]
8. Define AVL Tree. Explain Insertion operation on AVL tree with simple examples. CO4-L2-[12M]
9. Define AVL Tree. Explain Deletion operation on AVL tree with simple examples. CO4-L2-[12M]
10. a) Construct AVL tree for the list by successive insertion: 5, 6, 8, 3, 2, 4, 7 . CO4-L2-[6M]

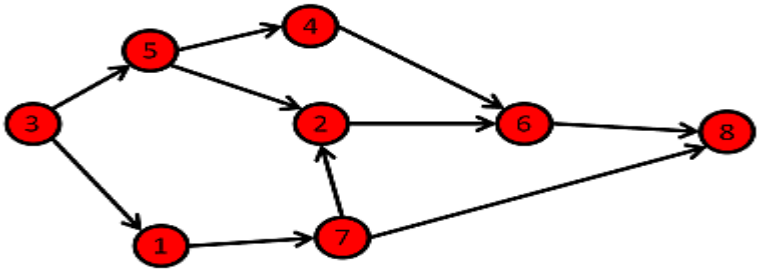
    b) Explain LL Rotation and RR rotation with examples. CO4-L2-[6M]

Unit-V

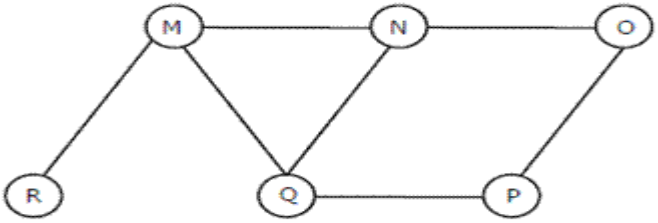
1. Consider the graph given below, Write the adjacency matrix, Linked list and Set representation of Graph and also find out the degree of each node. CO5-L3-[12M]



2. Write algorithm for DFS of a graph. And find DFS of following Graph using STACK By considering 3 as Starting Vertex. CO5-L3-[12M]



3. Write algorithm for BFS of a graph. And find BFS of following Graph using QUEUE By considering R as Starting Vertex. CO5-L3-[12M]



4. a) Write algorithms for Inserting a new vertex in to a graph CO5-L2-[6M]

   b) Write algorithms for Inserting a new edge in to a graph CO5-L2-[6M]

5. a) Write algorithms for Deleting a vertex from a graph CO5-L2-[6M]

   b) Write algorithms for Deleting a edge from a graph CO5-L2-[6M]

6. Show the result of inserting the keys: 1 2, 44, 13, 88, 23, 94, 11, 39, 16 into a hash table of size m =13 with the primary hash function as h(k) = k % m usin g Linear Probing CO5-L3-[12M]
7. Show the result of inserting the keys: 12, 44, 13, 88, 23, 94, 11, 39, 20 into a hash table of size m =11 with the primary hash function as h(k) = k % m using Quadratic Probing CO5-L3-[12M]
8. Show the result of inserting the keys: 15, 11, 25, 16, 36, 47, 22 into a hash table of size m =11 using Double hashing with h1(k) = k % m and h2(k)=R - (k mod R)where R < m and is prime CO5-L3-[12M]
9. Calculate the hash table indexes using Division and Multiplication hash functions for the keys: 25, 4, 16, 100, 32, 58 with the size of the hash table as m=11 CO5-L3-[12M]
10. Construct the open hash table using separate chaining for the input: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 140 using the hash function h(k)= k mod 11 CO5-L3-[12M]