M18001045

Registration No: | | | | | | | | | | |

Total Number of Pages : 04 **B.TECH**

B.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018
DATA STRUCTURE USING C++
Subject Code:BBSES2050
Time: 3 Hours
Max Marks : 100

CO1 Understand and explain data, array stack, Queue and its application.
CO2 Understand, explain and apply different searching ,sorting and linked lists
CO3 Understand, explain and apply different types trees and its representation
CO4 Demonstrates Heaps, Graphs, Hashing and its application.

PART-A

(10X1 = 10 MARKS)

Answer *All* Questions.

a. A queue in which insertion is possible only at one end but deletion is possible at both ends is called? [CO1]

a) circular queue b) input restricted DEQUE

c) priority queue d) output restricted DEQUE

b. Given an infix expression : (P+Q-R/T). What is its equivalent postfix notation? [CO1]

a) PQ+RT/- b) PQ+R-T/ c) P+QR-/T d) PQRT+-/

c. Which of the following formula is used to calculate Rear value during insertion in a circular queue? [CO1]

a) Rear=Rear-1 b) Rear=(Front+1)%Size of Queue

c) Rear=(Rear-1)%Size of Queue d) Rear=(Rear+1))%Size of Queue

d. In which of the following methods each element is compared with adjacent element? [CO2]

c) insertion sort d) quick sort a) bubble sort b) selection sort

e. Which of the following statement is TRUE about double linked list? [CO2]

a) Traversing is possible only in one-way

b) Traversing is possible in two-ways

c) Binary search can be applied

d) Direct interaction to any node is possible.

f. How many nodes will be there in a Full Binary Tree having 4 levels? [CO3]

a) 15 b) 31 c)4 d)8

g. What is the degree of a node which is connected with 5 child nodes in a tree? [CO3]

a) 0 b) 5 c) 4 d) 6

h. Which of the following is TRUE about binary tree? [CO3]

a) It is a cyclic graph b) It is an acyclic graph

c) It is a simple graph d) it is a complete graph

i. An edge that connects a vertex to itself is called? [CO4]

a) cycle b) connected

c) self loop d) adjacent

j. In hashing, if two key values generate same hash address then it is called.

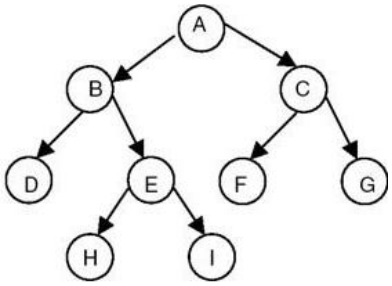
a) linear probing b) random probing [CO4]

c) collision d) chaining

PART-B (15 x 2 = 30 MARKS)

Answer any fifteen questions from the following.

1. The following sequence of operations is performed on an empty stack: [CO1]
   PUSH (Q), PUSH (W), PUSH (E), PUSH (R) , POP, POP, PUSH (T), POP
   Write down the sequence of the popped out items.
2. Explain the mathematical process to convert an infix expression: (C^D+E*F-G/H) into equivalent prefix notation. [CO1]
3. Given base address 1234 of a matrix P[6][6]. Assume each element occupies 5 bytes, find the address of P[2][3] when it is represented in column major order. [CO1]
4. How Front value is calculated during deletion operation in a circular queue? [CO1]
5. Explain the process during insertion of an element at a specific location in an array? [CO1]
6. Write down the situation when linear search is better than binary search. [CO2]
7. How a pivot value is chosen while applying quick sort? [CO2]
8. What is linked stack? Explain with an example. [CO2]
9. Write down the steps to delete the 1st node in a single linked list. Explain with diagram. [CO2]
10. Write the steps to traverse a double linked list in backward direction.(i.e: from last node to 1st node) [CO2]
11. For the following given binary tree: [CO3]



   a. What are the sibling nodes of D?
   b. What are the degree of nodes A,C,E?
   c. What is the depth of nodes C,E,H?
   d. What are the leaf nodes exist?

12. Construct a binary tree when the sequence of nodes given as: [CO3]
    i. Inorder : D B A G E H C F
    ii. Preorder : A B D C E G H F

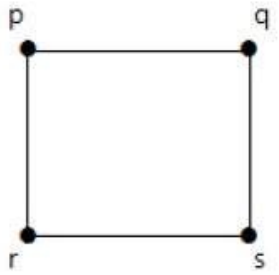
13. Construct a Binary Search Tree by taking the following sequence of alphabets:
    D, E, A, F, B, C, G [CO3]

14. Construct an expression tree for the given arithmetic expression: (X-Y-Z+F/G/H)
    [CO3]

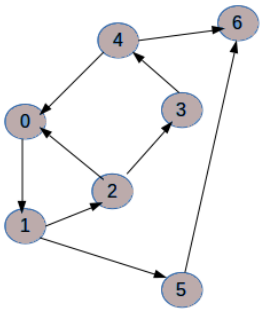
15. Construct an AVL tree for the given list of elements: 55, 99, 88, 77, 44, 22 [CO3]

16. Construct a Max-Heap Tree for a given list of elements: 20, 30, 10, 50, 90, 70 [CO4]

17. Write down the adjacency matrix of a graph given below: [CO4]



18. Find the in-degree and out-degree of each vertex of a graph given below: [CO4]



19. What is a weighted Graph? Draw a diagram of weighted graph. [CO4]

20. What is mid square method in hashing? Write a simple example to explain it. [CO4]

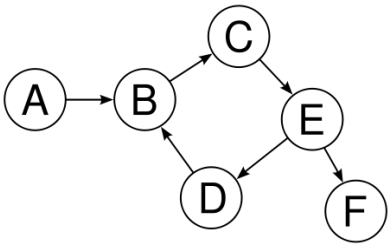
PART-C (6 x 5 = 30 MARKS)

Section-i **Answer any Six questions**

1. Write the algorithm for push and pop operations in a stack. Explain how push and pop operations are performed by taking a suitable example. [CO1]
2. Given infix expression P*Q-(R^S/T). Use stack to generate equivalent postfix expression. [CO1]
3. Write an algorithm for bubble sort. Explain it with suitable example. [CO2]

4. Given list of elements: 19, 91, 29, 553, 789, 567, 32, 38, 563, 90, 100, 25
   Apply Radix sort to arrange the elements in ascending order. [CO2]

5. What are AVL rotations? Explain each with suitable example. [CO3]
6. What is a Binary Search Tree? Write down the steps to delete ROOT node of a BST. [CO3]
7. Define path matrix? Write down the adjacency matrix for the graph given below. [CO4]



8. What is hash function? Use the division method to generate hash addresses for the given key values: 43, 62, 59, 31, 10, 19, 77, 33, 35, 69 [CO4]

Section-ii **Answer any Two questions** **(2 x 15 = 30 MARKS)**

1. a. Write down the algorithm for performing insertion and deletions operations in a circular queue. Explain with a suitable example. [CO1] **[10]**

b. Write down the algorithm for linear search and explain with an example. [CO1] **[5]**

2. a. Write down the algorithms for performing following operations on single linked list: [CO2] **[10]**
   1) insertion at the beginning
   2) deletion from the beginning

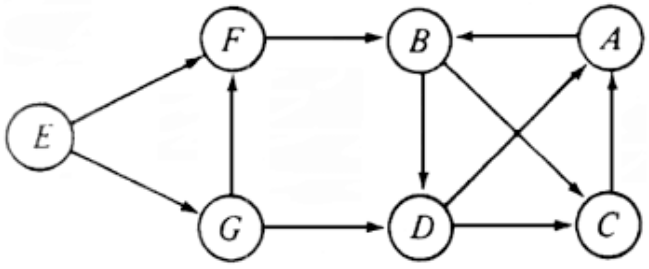
b. Given a double linked list, explain how to delete a node from the beginning? [CO2] **[5]**

3. a. Explain the advantage of linked representation over array representation of a binary tree with an example . Write down the construction procedure of a binary tree using following traversal methods:
i) inorder and preorder [CO3] **[10]**

ii) inorder and postorder.

b) Define Heap. Write an algorithm to make a node as heap in a given binary tree. [CO3] **[5]**

4. a. Write the algorithm for implementing Breadth First Search in a graph. Write down BFS order for the following graph: [CO4] **[10]**



b) When collision occurs in hashing? Explain chaining with suitable .example. [CO4] **[5]**

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