2022

GURU TEGH BAHADUR INSTITUTE OF TECHNOLOGY

[DATA STRUCTURES ASSIGNMENTS]

Paper code: CIC-209

Assignment-1

on

Array, Linked List

Q1. Write a Program implementing insertion operation in an array.

Q2. Run Time Memory Allocation is known as?

Q3. Write the merits and demerits of using Arrays and Linked List for linear data structures.

Q4. Given an Array A(20.. 50,20..40). The elements are stored in Column Major Order. What is the starting location of A (32,23) ?

Q5. Which of the following: singly-linked list or doubly-linked list implementations are more complex?

Q6. Write functions Insert and Remove which add and remove nodes from ordered single linked list based on the Node value?

Q7. Write an algorithm to reverse a list.

Q8. What are the advantage and disadvantage of using Circular Linked List?

Q9. Write an algorithm to insert a node at a given position in a doubly linked list.

Q10. Give the algorithm of searching in linked list when list is sorted.

Q11. Write a function to remove the nodes with repetitive data in a linked list?

Assignment-2
on
Stack, Queue

Q1. What do you mean by queue? What are the practical applications of queue?

Q2. Compare different implementations of queue. Write a function to delete elements in circular queue.

Q3. Explain queue.give the algorithm of deletion in the circular queue.

Q4. Consider the following queue ,where queue is a circular queue having 6 memory cells.
Front=2 ,Rear=4 Queue: _ ,A,C,D,_,_ Describe queue as following operation take place:

        a) F is added to the queue
        b) Two letters are deleted
        c) R is added to the queue
        d) S is added to the queue

Q5. Difference between linear queue and circular queue.

Q6. Convert the expression $((A + B) * C - (D - E) \wedge (F + G))$ to equivalent Prefix and Postfix notations.

Q7. Describe stack operation.

Q8. Write the prefix form of $A ** -B + C$

Assignment-3

Trees

1. Suppose the following sequence list the nodes of a binary tree T in pre-order and in-order respectively:

   Pre order: G,B,Q,A,C,K,F,P,D,E,R,H

   In order: Q,B,K,C,F,A,G,P,E,D,H,R

   Draw the diagram of the tree.

2. Write an algorithm to find minimum spanning tree of the given graph.

3. How a binary tree is different from binary search tree.

4. Define Binary trees.How it can be represented in the memory.

5. Draw a binary Tree for the expression : A * B - (C + D) * (P / Q)

6. Define threaded binary tree.

7. Define binary search tree. Construct a binary search tree by inserting the following numbers in order of their occurrence:

   50, 33, 44, 22, 77, 35, 60, 40

8. Draw the B-tree of order 3 created by inserting the following data arriving in sequence - 92 24 6 7 11 8 22 4 5 16 19 20 78

9. Suppose the following list of letters is inserted in order into an empty binary search tree:

   J,R,D,G,T,E,M,H,P,A,F,Q

   a) Find the final tree T   b) Find in order traversal of T

10. What do you mean by height balanced tree? How a height balanced tree is different from a binary search tree. What do u mean by rebalancing of height balanced tree. Explain with example.

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Assignment-4

Q1. Write notes on:
   a) B-trees
   b) Sequential file organization
   c) Inverted files

Q2. Explain AVL trees. Construct an AVL search tree by inserting the following elements in order of their occurrence.
64, 1, 44, 26, 13, 110, 98, 85

Q3. Define bubble sort. Give the algorithm and explain it with example. Suppose the following numbers are stored in an array A. 32, 51, 27, 85, 66, 23, 13 and 57. Sort the array using bubble sort.

Q4. What is the average number of comparisons needed in a sequential search to determine the position of an element in an array of 100 elements, if the elements are ordered from largest to smallest?

Q5. What do u mean by searching. What are the conditions for binary search. Explain the algorithm for the binary search.

Q6. What do you mean by hashing? How do you resolve collision in hashing?

Q7. Give the complexity of all sorting algorithms.

Q8. Write an algorithm for radix sort.

Q9. Illustrate Shell Sort with gap set (4, 2, 1) and gap set(5, 3,1)
   76, 31, 40, 44, 61, 55, 32, 34, 5

Q10. What are the various ways to store the Graphs in Memory?

Q11. Compare Sequential and random file organization.

Q12. Discuss Random file Organization and various techniques used for randomization.

Q13. Explain various techniques for overflow / collision resolution in case of hashing.