

Techno India College of Technology

Assignment List, 2nd Semester 2018

Subject: Data Structure Lab

Subject Code: MCA293

1. Write a menu based program using array to implement the following operations:
 - a) Insertion
 - I. By position
 - II. By value
 - b) Deletion
 - I. By position
 - II. By value
 - c) Merge two arrays into one.
2. Create a singly (linear) linked list to do the following:
 - a) Print the list.
 - b) Print in reverse order.
 - c) Insert an element after an element.
 - d) Delete an element before an element. If the key value is not present print appropriate message.
3. Create a singly (Circular) linked list to do the following:
 - e) Print the list.
 - f) Print in reverse order.
 - g) Insert an element after an element.
 - h) Delete an element before an element. If the key value is not present print appropriate message.
4. Create a doubly (linear) linked list to do the following:
 - a) Print the list.
 - b) Print in reverse order.
 - c) Insert an element after an element.
 - d) Delete an element before an element. If the key value is not present print appropriate message.
5. Create a doubly (Circular) linked list to do the following:
 - e) Print the list.
 - f) Print in reverse order.
 - g) Insert an element after an element.
 - h) Delete an element before an element. If the key value is not present print appropriate message.
6. Write a program that will reverse a list while traversing it only once. At the conclusion, each node should point to the node that was previously its predecessor, the head should point to the node that was formerly at the end and the node that was formerly first should have a null link.

7. Consider the polynomial of the form
$$P(X) = C_1X^{e_1} + C_2X^{e_2} + C_3X^{e_3} + C_4X^{e_4} + \dots$$

Where $e_1 > e_2 > e_3 > \dots > e_n \geq 0$. Such polynomials can be represented by a linked list in which each node has three fields; one for the co-efficient, one for the exponent, and one pointing to the next node. Write procedures for

- a) Adding
 - b) Multiplying
8. Write a program to find an intersection point of two linked lists of length m and n. What is the complexity of your program? Is it possible to reduce the complexity of your program? If yes, then write a program to implement it.
9. Write a program to implement a sparse matrix.
10. Write a program to implement Fibonacci series using recursion.
11. Write a program to implement Tower of Hanoi problem using recursion.
12. Write a program to create a stack and implement two operations push () and pop () using an array and linked list.
13. Write a program for the evaluation of a postfix expression.
14. Write a program for conversion of infix to postfix expression.
15. Write a program for conversion of infix to prefix expression.
16. Write a recursive algorithm for the following problems:
- a) Reverse an array.
 - b) Binary search on an array of size n to find an element.
 - c) Find a peak element in a one dimensional array.
17. Implement a queue using linked list, to implement two procedures, one for insertion and other for deletion.
18. Implement a circular queue using array, to implement two procedures, one for insertion and other for deletion.
19. Write a program to implement priority queue using linked list.

20. Write a program to implement following operations in a Binary Search Tree (recursive)

- a) In-order, Pre-Order, Post-Order traversal.
- b) To count the number of nodes
- c) To find the depth

21. Write a program to implement the following Sorting Technique:

- a) Insertion Sort
- b) Selection Sort
- c) Bubble Sort
- d) Quick Sort
- e) Merge Sort
- f) Heap Sort
- g) Radix Sort

22. Write a program to implement Breadth First Search algorithm.

23. Write a program to implement Depth First Search algorithm.