

Programs of Data Structures

1. Write C++ program for storing binary number using doubly linked lists. Write functions
 - a) to compute 1's and 2's complement
 - b) add two binary numbers
2. An $m \times n$ matrix is said to have a saddle point if some entry $a[i][j]$ is the smallest value in row i and the largest value in j . Write C/ C++ function that determines the location of a saddle point if one exists.
3. Write C++ program for storing appointment schedule for day. Appointments are booked randomly using linked list. Set start and end time and min and max duration for visit slot. Write functions for-
 - a) Display free slots
 - b) Book appointment
 - c) Cancel appointment (check validity, time bounds, availability etc)
 - d) Sort list based on time
 - e) Sort list based on time using pointer manipulation
4. The ticket booking system of Cinemax theater has to be implemented using C++ program. There are 10 rows and 7 seats in each row. Doubly circular linked list has to be maintained to keep track of free seats at rows. Assume some random booking to start with. Use array to store pointers (Head pointer) to each row. On demand
 - a) The list of available seats is to be displayed
 - b) The seats are to be booked
 - c) The booking can be cancelled.
5. Department of Computer Engineering has student's club named 'Pinnacle Club'. Students of Second, third and final year of department can be granted membership on request. Similarly one may cancel the membership of club. First node is reserved for president of club and last node is reserved for secretary of club. Write C++ program to maintain club member's information using singly linked list. Store student PRN and Name. Write functions to

- a) Add and delete the members as well as president or even secretary.
- b) Compute total number of members of club
- c) Display members
- d) Display list in reverse order using recursion
- e) Two linked lists exists for two divisions. Concatenate two lists.

6. A palindrome is a string of character that's the same forward and backward. Typically, punctuation, capitalization, and spaces are ignored. For example, "Poor Dan is in a droop" is a palindrome, as can be seen by examining the characters "poor danisina droop" and observing that they are the same forward and backward. One way to check for a palindrome is to reverse the characters in the string and then compare with them the original-in a palindrome, the sequence will be identical. Write C++ program with functions-
 1. to check whether given string is palindrome or not that uses a stack to determine whether a string is a palindrome.
 2. to remove spaces and punctuation in string, convert all the Characters to lowercase, and then call above Palindrome checking function to check for a palindrome
 3. to print string in reverse order using stack
7. Pizza parlor accepting maximum M orders. Orders are served in first come first served basis. Order once placed cannot be cancelled. Write C++ program to simulate the system using circular queue using array
8. Magic square is an $n \times n$ matrix of the integers 1 to n^2 such that the sum of each row, column, and diagonal is the same. The figure given below is an example of magic square for case $n=5$. In this example, the common sum is 65. Write C/C++ Program for magic square.

Example:

15	8	1	24	17	
16	14	7	5	23	
22	20	13	6	4	
3	21	19	12	10	
9	2	25	18	11	

