* Data Structure Lab (DSL) - Practical Number - 8 (Group - C)

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Title :-
Write a C++ program to implement ticket booking system.

Aim :-
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 pointer (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.

Objectives :-
1) To study the concept of doubly circular linked list.
2) To understand operations on doubly circular linked list.

Theory:-

Doubly circular Linked List:-

Doubly circular linked list has properties of both doubly linked list and circular linked list in which two consecutive elements are linked or connected by previous and next pointer. The last node points to the first node by next pointer and also the first node points to the last node by previous pointer.

Advantages:-

1) List can be traversed from both the direction i.e from head to tail or from tail to head.

2) Jumping from head to tail or from tail to head is done in constant time O(1).

3) Circular doubly linked list are used for implementation of advanced data structures like Fibonacci Heap.

Algorithm:-

Step1- Start

Step2- Create structure for doubly circular linked list.

Step3- Create a class ticket with constructor and member methods to operate on doubly circular linked list.

Step4- Using the display method, display all the seats with their status being un-booked.

Step 5 - If user wants to book tickets, then accept the seat row and column number to be booked.

Step 6 - If the particular seat is not book, then change its status to booked ('B').

Step 7 - If user wants to cancel the tickets, then accept the seat row and column number to be cancelled.

Step 8 - If that particular seat is booked, then change its status to not booked ('A')

Step 9 - Display the seats and their status if user wants to see the unbooked seats.

Step 10 - Go to step 4 if user wants to continue.

Step 11 - Stop.

Analysis :-

Time complexity of

1) Constructor is - $O(n^2)$
2) Display is - $O(n^2)$
3) Booking and cancelling - $O(n)$
4) multiple_ticket - $O(n)$.

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Conclusion:-

Hence, we have implemented ticket booking system using doubly circular linked list.