CSN-261: Data Structures Laboratory

Lab Assignment 3 (L3)

Instructions:

1. **Use either C/C++ for solving the assignment.**
2. **Throughout the assignment, *n* represents the number of rows, and N is the maximum number of passengers.**
3. **Array index starts with 0 in C/C++.**
4. **RED color indicates the input in each test case.**

Problem. Consider an aeroplane with a front door and a rear door, and the rear door is permanently **LOCKED** (passenger is not allowed to go **IN** and **OUT** from the rear door). There are *n* number of homogeneous rows in the flight, and each row is arranged with **6** seats and divided into two equal halves (**3 seats of each**).

Example:

(window side) s1(A), s2(B), s3(C) | passenger entryway | s6(F), s5(E), s4(D) (window side)

Two steps are followed by a passenger to get a seat. First, a passenger searches for the row number that is mentioned on the boarding pass (e.g., **15A: 15 is row number, and A is the seat ID of the respective row**). Second, a passenger can go either left or right as per the **seat ID** sequence. Second step is followed after the first step. **LIFO** order is followed by each passenger for an **Entry/Exit** of the respective seat in each halve (left or right). Similarly, **LIFO** order is followed by the passengers **during a full Exit** from the flight based on **ROW NUMBER,** and a random row number passenger can be opted for **SOLE Entry/Exit .**

Considering this scenario, write a program to implement a data structure for the flight with two functions *Entry()* and *Exit()* for the passenger's entry and exit into flight. In order to do this, the following assumptions can be made.

1. **A passenger can enter in the flight with a boarding pass of random ordered seat numbers.**
2. **A passenger can exit from the flight following a random order.**
3. **At a time only one passenger can be in/out.**
4. **A Passenger can be represented with an ID (e.g., P1).**
5. **Error messages should be shown if the passenger already exists on ENTRY.**
6. **Error messages should be shown if the passenger does not exist on EXIT.**
7. **Entry/Exit function must check the UPPER BOUND of the Passenger count < N(= *n*6*) (maximum value for *N*= 60)**

Test Cases (*n* =5):

Print: Enter your choice

E1 for Passenger Entry

E2 for Passenger Exit

E for Program Exit
P for Print
X for Full Exit: **E1**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P1 5 C**

Print: Push P1

Print: Enter your choice

E1 for Passenger Entry
E2 for Passenger Exit
E for Program Exit
P for Print
X for Full Exit : **E1**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P7 2 C**

Print: Push P7

Print: Enter your choice

E1 for Passenger Entry
E2 for Passenger Exit
E for Program Exit
P for Print :
X for Full Exit: **E1**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P5 2 B**

Print: Pop P7

Print: Push P5

Print: Push P7

Print: Enter your choice

E1 for Passenger Entry
E2 for Passenger Exit
E for Program Exit
P for Print
X for Full Exit: **E1**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P3 2 A**

Print: Pop P7

Print: Pop P5

Print: Push P3

Print: Push P5

Print: Push P7

Print: Enter your choice

E1 for Passenger Entry
E2 for Passenger Exit
E for Program Exit
P for Print
X for Full Exit: **E1**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P13 2 E**

Print: Push P13

Print: Enter your choice

E1 for Passenger Entry
E2 for Passenger Exit
E for Program Exit
P for Print
X for Full Exit: **E1**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P12 5 D**

Print: Push P12

Print: Enter your choice

I for Insert
D for Delete
E for exit
P for Print
X for Full Exit: **P**

Print: Flight occupancy status is:

	A	B	C	||	F	E	D
Row1:	0	0	0	||	0	0	0
Row2:	P3	P5	P7	||	0	P13	0
Row3:	0	0	0	||	0	0	0
Row4:	0	0	0	||	0	0	0
Row5:	0	0	P1	||	0	0	P12

Print: Enter your choice

E1 for Passenger Entry
E2 for Passenger Exit
E for Program Exit
P for Print
X for Full Exit: **E2**

Print: Enter **passenger ID,** boarding **row number** and **Seat number**: **P3 2 A**

Print: Pop P7
Print: Pop P5
Print: Pop P3
Print: Push P5
Print: Push P7

Print: Enter your choice

I for Insert
D for Delete
E for exit
P for Print
X for Full Exit: **P**

Print: Flight occupancy status is:

	A	B	C	||	F	E	D
Row1:	**0**	**0**	**0**	||	**0**	**0**	**0**
Row2:	**0**	**P5**	**P7**	||	**0**	**P13**	**0**
Row3:	**0**	**0**	**0**	||	**0**	**0**	**0**
Row4:	**0**	**0**	**0**	||	**0**	**0**	**0**
Row5:	**0**	**0**	**P1**	||	**0**	**0**	**P12**

Print: Enter your choice

I for Insert
D for Delete
E for exit
P for Print
X for Full Exit: **X**

Print: The LIFO order of passengers is:

Print: Pop P7
Print: Pop P5
Print: Pop P13
Print: PoP P1
Print: Pop P12

Print: Enter your choice

I for Insert
D for Delete
E for exit
P for Print
X for Full Exit: **E**

Print: Program is Stopped.