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Advanced Programming Round

ZOHO

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Duration : 3 hours

General Instructions:

- Carefully read and understand the entire question before starting the program. Ask the invigilator for clarification if needed.
- Discuss your logic with the invigilator before coding, and share outputs after completing every two tasks.
- You can use Java, C, C++, or C# for the program. Feel free to use any standard IDE/Compiler/Interpreter or an online compiler.
- Ensure your program handles various inputs without hard-coding, using a logical and standardized approach. These factors will be considered during evaluation.
- Test your program with the provided sample inputs to ensure accuracy.
- The program should keep running until you explicitly choose to exit.
- Create a folder on the desktop with your name and department and save all source files there (e.g., "Arun_ECE" or "Geetha_CSE").

Write a program to book train tickets as per the details given below.

- Train starts from station 'A' and reaches station 'E'.
- Assume the station order as A --> B --> C --> D --> E
- Tickets can be booked from any place, i.e ('A' to 'E') or ('C' to 'E') or ('B' to 'D') etc...
- A single ticket can be booked for multiple passengers. For example, if four people are travelling as a group, then it will be one ticket which will have the seating information for four people.
- The train has only one coach with eight seats.
- There can be a maximum of 2 Waiting list seats in addition to 8 confirmed seats.

- Each ticket is uniquely identified by a sequentially generated number called PNR (both for confirmed and waiting list booking)
- If a passenger is allocated a seat for a ticket booked between D -> E, then same seat should not be allotted for other tickets booked for A->E, where as it can be allocated for any booking between stations A --> D
- Book tickets only when all the requested number of seats are available in a booking (either Confirmed or WL seat) . For e.g if 4 seats are requested, book only when all four are available but should not book when only 3 or less seats are available.
- Each ticket once booked / cancelled should have the source, destination, no. of seats, and the status (booked / cancelled) printed.
- A ticket should be cancelled using the PNR. Once a ticket has been cancelled, the PNR should not be reused again.
- Partial cancellation should be supported. I.e If a PNR has 4 seats booked, then it should be possible to cancel 2 seats alone.
- When a ticket is cancelled, the passengers in the waiting list should be moved up provided following conditions are met Assume WL1 is from A --> D and WL2 is from D --> E. If a cancellation happens from C --> E, In such case, the WL1 cannot be accommodated since it is from A --> D. So, here the WL2 should be moved to confirmed list

You can hard code the input in the below format in your program.

Booking format (<book> <Source station> <Destination station> <No of tickets>)

book,C,D,2

Cancel format (<cancel> <PNR Number> <Number of tickets>)

cancel,2,2

To print the booking summary & chart

chart

Sample Data with explanation given below. Use the same data input in your program when showing results

Data Input	Notes for your understanding alone
book,A,E,8	PNR 1 booked
book,A,E,2	PNR 2 booked with 2 WL tickets
cancel,1,5 5	tickets from PNR-1 will be cancelled; WL1 & WL2 will be confirmed
chart	prints booking, summary & chart
cancel,1,3	3 tickets from PNR-1 will be cancelled
cancel,2,2	2 tickets from PNR-2 will be cancelled. All the seats are free
book,A,C,8	PNR-3 will be booked
book,C,E,8	PNR-4 will be booked
book,A,E,2	PNR-5 will be booked with 2 WL tickets
chart	prints booking summary & chart. All seats are occupied between all stations
book,C,D,2	due to ticket unavailability between stations, this booking should fail
cancel,3,8	8 tickets from PNR-3 will be cancelled
chart	prints booking summary & chart. You can see that all seats are occupied between C -->D stations
cancel,4,8	8 tickets from PNR-4 will be cancelled and 2 WL tickets from PNR-5 will get confirmed
chart	prints booking summary & chart. You can see that seats 1,2 will be occupied for stations A-->D
book,C,E,3	PNR-6 will be booked

Sample Summary print for the above sample data

PNR 1, A to E, Seat Nos: 1, 2, 3, 4, 5, 6, 7, 8

PNR 2, A to E, Seat Nos: WL1, WL2

PNR 1, A to E, Seat Nos: 6, 7, 8 Cancelled Seats : 1, 2, 3, 4, 5

PNR 2, A to E, Seat Nos: 1, 2

PNR 1, A to E, Seat Nos: - Cancelled Seats: 1, 2, 3, 4, 5, 6, 7, 8

PNR 2, A to E, Seat Nos: - Cancelled Seats : 1, 2

PNR 3, A to C, Seat Nos: 1, 2, 3, 4, 5, 6, 7, 8

PNR 4, C to E, Seat Nos: 1, 2, 3, 4, 5, 6, 7, 8

PNR 5, A to E, Seat Nos: WL1, WL2

No seats available

PNR 3, A to C, Seat Nos: - Cancelled Seats: 1, 2, 3, 4, 5, 6, 7, 8

PNR 4, C to E, Seat Nos: - Cancelled Seats: 1, 2, 3, 4, 5, 6, 7, 8

PNR 5, A to E, Seat Nos: 1, 2

PNR 6, C to E, Seat Nos: 3, 4, 5

Sample Output format for booking summary & chart

	A	B	C	D	E
1	*	*	*	*	
2	*	*	*	*	
3			*	*	
4			*	*	
5			*	*	
6					
7					
8					