Assignment-2
The Ticket Counter

Objective:

Simulate a railway ticket booking system where several ticket booking agents (clients) simultaneously book tickets by sending requests to the central server.

Implementation Details:

Server: The server will accept multiple requests from different booking agents (clients) and handle those requests through *select()*. The train details are as follows:

Train (Number/Name)	#coaches/#seats (AC)	#coaches/#seats (Sleeper)	Available Berth Types
12321/Superfast Exp	3(A-1 to A-3)/72	12(S-1 to S-12)/72	SU, SL, UB, MB, LB
12301/Rajdhani Exp	13(A-1 to A-13)/54	-	SU, SL, UB, LB

SU: Side Upper, SL: Side Lower, UB: Upper Berth, MB: Middle Berth, LB: Lower Berth

The server will allot the berths according to the preferences (if provided in the client's request) or in the continuous fashion (if the preference is not provided).

Note that the berth allocation can be extended to the next coach if required. Berth allotment in the same coach for a booking should have higher priority over berth preference. If there are no berths available then server should return "Sorry! no berths available!".

Also, their is no provision for partial booking i.e. for a request, either all the berths will be booked or none. If the booking is successful, then server will return the

coach number and the berth numbers allotted (you can follow your own format for response).

A policy need to be defined by server while processing multiple simultaneous request -- use timestamp to resolve this.

The server will have an option (press a button, say '1') to display the current booking status of all the trains. To implement this, server has to *fork()* a separate child process. Details should be displayed in the following tabular format:

Train	#seats Total[Booked/Available] (AC)	#seats Total[Booked/Available] (Sleeper)
Superfast Exp	216[132/84]	864[487/377]
Rajdhani Exp	702[702/0]	-

Booking Agent: The booking agent will read the booking details from a *.csv* (comma separated values) file where every line is a separate booking request. The booking agent will wait for a fixed period of time (5 seconds) after every booking request. The format of booking file is as follows:

Passenger ID	Train	Coach Type	#berths	Preferences	Ages of Passengers
1	12321	AC	4	SL-SU-LB-LB	17-43-22-78
2	12321	Sleeper	2	SU-UB	28-24
3	12301	AC	1	NA	23

*Here NA signifies no preferences and the preferences and ages are separated by hyphen (-)

After getting the response from the server the booking agent will write that response into another *.csv* file containing 2 columns - Passenger ID and server response.

Implement at least three booking agents and a server to simulate *"The Ticket Counter"*.

Tasks:

(a). Implement a server
(b). Implement booking agent process.
(c). Berth allocation policy
(d). Display system in server

(e) Prioritize booking which has (i). more number of passengers and (ii). more number of senior citizens. Design a policy keeping the above two in mind - state clearly the policy implemented.

Consider all sockets as TCP sockets