CS307 HW1 REPORT

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In this airline reservation program, I implemented a three threaded program, one of them being the main thread and the other two being travel agencies thread. I use three global variables. First is the 2-D array that represents the seats. Second is the variable that shows the remaining capacity (empty seats) of the plane. Third one is the turn variable for the busy waiting. This way all three threads can use these data.

First the main thread starts and creates the other two threads for travel agencies with their respective ids. Then in an infinite loop, it continues with checking the remaining capacity of the plane continuously. It terminates when capacity is zero, in other words when there are no empty seats remaining. After confirming that no seats remain, it prints out the seats on the console showing which agency booked which seat with their respective id. Since this is a concurrent program, while main thread checks for the capacity the other two threads also execute.

Secondly there are two travel agency threads. I created these threads with the same function instead of using two separate functions with the same code since they do the exact same things. To identify the threads, I passed the id of the agency as argument while creating the threads with pthread_create() function. Travel agency function starts with getting a random number between 1 and 100. With the help of the globally initialized turn variable, both threads do busy waiting until it is their turn. If the turn variable is equal to their id, they get out of busy waiting and enter the critical region. It also prints out that they have entered critical region. It continues with checking if the remaining capacity is zero. If it is not, then it checks if the seat that corresponds to the random number in the beginning is empty. If it is then it books that seat and decreases the remaining capacity by one. Since critical region is completed, they print out a message saying so and updates the turn variable so that the waiting thread can continue. If the capacity is zero function returns NULL and thread finishes. If the seat for corresponding random number is already booked, function doesn't do anything, but it updates the turn variable so that it can generate a new random number.