CS307 HOMEWORK 1

Dilara Nur Memiş - 27868

Global Variables of The Program:

Seats array : 2D array that represents seats of the plane. Initially all elements are 0 (which are initialized to 0 in the main function.)

Reserved : It keeps track of number of seats reserved so far.

Turn : For busy waiting of threads, I define a Shared variable turn which is initially zero.

Flag : This boolean variable is used to print out "no seats left" statement only once. (not in both threads).

Main Function:

My program starts with main function which follows the below steps:

1. Initializing all elements of 2D array to zero. That represents all seats are empty in the beginning.
2. Creating two integers representing the IDs of the threads.
3. Creating threads.
4. Joining threads so that the main function will not terminate before the threads are terminated.
5. After both threads are terminated since no empty seats are available, main function prints out “Plane is full” and 2D array corresponding the current status of the seats.

void * reverse (void * threadID) Function:

Both threads are executing void * reverse (void * threadID) function which follows the below steps:

1. It takes thread ID as parameter.
2. If ID is 1, it means Agency 1 should be running, so Agency 2 must do busy waiting and vice versa.
3. If reserved is 100 and flag is false, it means that the running thread is the first thread for which “if (reserved ==100)” statement will be evaluating to true. So, this agency will enter/exit critical region and print “no seats left” statement and it will turn flag to false so that the other agency will not re-print the same statement. It will also change the value of turn variable so that the other thread can run and terminate. Finally, it will terminate itself.
4. If reversed is not 100, it means that there are still empty seats in the plane. So, the thread can continue its execution.
5. It will generate a random number. If corresponding element in the seats array is 0, the seat is available. The element in the array will turn into ID of the thread. Number of reserved seats will be incremented by 1. If the seat is already booked, the thread will not do anything.
6. Thread will leave its critical region and change the value of turn variable.