

## ECSE 427 Assignment #2 Report

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- 1) Synchronization tools are required to model this process because, if passengers were being added to and removed from the queue simultaneously, discrepancies would occur and the program would malfunction. For example, if synchronization tools were not used, a taxi thread could arrive to an empty queue and move to enter its sleep phase, but then the processor could switch to an airplane thread at that exact moment. Then, a passenger would arrive to the queue and send a wake signal to the taxi thread, but since the taxi thread wasn't sleeping yet, that wake signal would be dismissed, and then the taxi thread would enter sleep. The taxi thread could not be woken, and we would eventually have deadlock.

This is analogous to a taxi driver arriving at the taxi stand and seeing nobody in line, then deciding to put on noise-cancelling headphones, lock the doors, and take a nap. Then, when a passenger arrives, they can't wake up the taxi driver, and they can't take another taxi because the other taxis are stuck behind the sleeping taxi driver in the taxi stand. Nobody wants that!

- 2) The data from the requested tests is included along with this report, in files *Q2A.txt*, *Q2B.txt*, and *Q2C.txt*.
- 3) Since the program is running multiple threads, the print statements sometimes appear out of order of the actions occurring. However, to show that the planes are arriving and the taxis are leaving at the correct times, the passenger numbers can be checked. During testing, I also printed out the timing of operations to ensure that everything was occurring in the correct order.