

## CS 307 Programming Assignment 3 Report

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After input checks are done, I initialized four semaphores and one barrier:

- semaphore: This semaphore is used as a general lock for a person.
- semaphoreA: This semaphore is used for team A members when they are looking for a car and car is not ready. The driver (last person to enter) will release if/when necessary.
- semaphore: This semaphore is used for team B members when they are looking for a car and car is not ready. The driver (last person to enter) will release if/when necessary.
- outputSemaphore: This semaphore is used when a person prints "I've found a spot in a car". We need this semaphore because this output statement is not protected by the main semaphore and 'cout' statements might interfere with each other.
- barrier: This barrier is used to make the car with the 4 person wait when the driver is found otherwise the driver might say that "I'm driving the car" before passengers say that they've found a car. (To stop the driver for going too fast)

**Main Thread's** job is to make input checks, initialize these semaphores and barrier. Then create threads for every person depending on the arguments given and wait for them to finish at the end.

**Fan Threads** will wait for the main semaphore and then say that they are looking for a car. At the beginning Driver is set to false. Later their team is checked to know which team friendly and which team is the rival. There are integers numReadyA and numReadyB which shows the number of ready people for each team, we will use these integers to check if the car can be formed. For example, when numReadyA is three and the person searching for a car at the moment is also Team A, then he will form the car and decrease the numReadyA by three (waiting persons). If no car can be formed, he will increase his waiting counter and also will wait for the semaphore depending on their team. When he is done with all these, he will let go of the main semaphore. If the car can be formed (can be formed by the last person entering) that person will let go of the semaphores (other people in the car) depending on the team distribution and assign himself as the driver. All of them will print that they've found a car and wait at the barrier so that driver will only say that he is the driver after everyone says, "they've found a car". For the last part, the driver will print that he is driving the car while destroying and initializing the barrier for the next car.