

Kaan ATMACA 28239

PA-3 REPORT

In this PA I used `pthread_t`, `sem_t` and `pthread_mutex_t` for the program work with no synchronization errors. First starting in the main I created two arrays containing threads. One for teamA and the other for teamB. Afterwards I created them one by one in two for loops. TeamA was calling `findCarA` function meanwhile teamB was calling `findCarB` function. Both functions are similar the only difference is one prints team a the other prints team b. So looking at `findCarA` function we firstly lock the mutex. Next print the pid and which team for looking for a car. Next we increment the variables total number of team members in a car. Then there are three different conditions:

- The first one is we have 4 team a players in the current car if so then we decrease the number and `sem_post(&sema)` //which allows us to make the waiting semaphore a's to not wait and find the correct car they are supposed to be in. // We `sem_post` three times since we have at least three members for the car and are waiting for us.
- Next condition is if we have more then 4 people in the car where at least 2 is from team a and two is from team b then we again decrement the numbers of the people and post semaphores. We will this time post one semaphore for team a (`sema`) and two for team b (`semb`). //if we were in `teamb` function then two `sema` and one `semb` is posted.
- Last condition is where we don't have enough people yet for the car so we unlock the mutex and start waiting for the semaphore we want `sema` //if we were in `teamb` function then we would wait for `semb`. After we wait and get the posts we lock again and continue

Nextly once we get the posts and stop waiting we print that we spotted a car for the current pid. Nextly if the person for the car is the forth person we say that he/she is the captain and will drive the car. And lastly we unlock the mutex.

This is a correct implementation to complete the homework. For 4 spotted people in a car we have 1 captain. There is always 2-2, 4-0 or 0-4 from each team in the car. And also we do not have deadlocks. Hence the algorithm is correct.