OPERATING SYSTEMS Hw 5

Problem. Implement the Cigarette-Smokers problem using POSIX threads, semaphores and mutexes and other synchronization structures on Linux.

The Cigarette-Smokers Problem. Consider a system with three smoker thread and one agent thread. Each smoker continuously rolls a cigarette and then smokes it. But to roll and smoke a cigarette, the smoker needs three ingredients: tobacco, paper, and matches. One of the smoker threads has paper, another has tobacco, and the third has matches. The agent has an infinite supply of all three materials. The agent places two of the ingredients on the table. The smoker who has the remaining ingredient then makes and smokes a cigarette, signaling the agent on completion. The agent then puts out another two of the three ingredients, and the cycle repeats. Write an algorithm to synchronize the agent and the smokers using semaphores. Please show sample traces of your algorithm unless it will not be accepted.
Hint: You may use 4 semaphores:
semaphore tobacco_paper, semaphore tobacco_match, semaphore match_paper, semaphore done.

Homework Policies:

1. Please do not copy-paste similar content from Internet. Cheating is strongly discouraged.
2. Each student should do his homework seperately. Group work is not allowed.
3. Late homeworks will be graded as 0.
4. Please comment your source codes.
5. Your Class Demo will be on 3 days before the final grade delivery time at 14:00 (To be announced).
   Note: Please obey these grading policies, unless your grade will be decreased.
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