Operating Systems
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Homework 3

Problem 3.1

Solution:

```
// Pseudocode:

semaphore_t mutex = 1, detective = 0;
detectives_number = clients_number = 0;
queue detectives[]; // implement a queue that will store the detectives
semaphore_t detective_semaphore[] = 0; // one sem for each det

detectives(i)
{
    detective_semaphore[i] = 0;
    down(&mutex);
    detectives_number++;
    enqueue(detectives, detective_semaphore[i]);
    if(clients_number == 0) {
        up(&mutex);
        down(&detective_semaphore[i]);
    }
    else {
        dequeue(detectives);
        for(int i=0; i<clients_number; i++)
            // make sure all clients pass so that they can leave
            up(&detective);
        up(&mutex);
    }

    down(&mutex);
    detectives_number--;
    up(&mutex);

    leave_bar();
}

clients()
{
    down(&mutex);
    clients_number++;
    if(detectives_number == 0) {
        up(&mutex);
        down(&detective);
    }
    else {
        d = dequeue(detectives);
        up(&mutex);
        up(d);
    }
    down(&mutex);
    clients_number--;
    up(&mutex);

    leave_bar();
}
```