Homework 3

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1. Algorithm using mutex and conditional variables:

```
Bar{
        int detective_count = 0, client_count = 0, next_client = 0;
        mutex_t mutex, barrier;
        condition detective, client;
}

void client_visit_Bar{
        int check = 0;
        lock(&barrier);
        lock(&mutex);
        bar.client_count++;
        signal(bar.client);
        if(bar.detective_count == 0){
                check = 1;
                unlock(bar.barrier);
                wait(bar.detective, bar.mutex);
        }
        bar.client_count--;
        if((bar.client_count == 0) && (check == 1){
                unlock(bar.barrier);
        }
        unlock(bar.mutex);
}

void detective_visit_Bar{
        int check = 0;
        lock(&barrier);
        lock(&mutex);
        bar.detective_count++;
        if(bar.client_count == 0){
                check = 1;
                unlock(bar.barrier);
```

```
            wait(bar.client, bar.mutex);
        }
        for(i=0; i < bar.client_count; i++){
            signal(detective);
        }
        bar.detective_count--;
        if(check == 1){
            unlock(bar.barrier);
        }
        unlock(bar.mutex);
}
```