Readings: Appendix A.2

**Review on Semaphores**

Procrastinating Student problem

- It's the night before the final class, and CS341 students are staying up all night finalizing their projects to present the next day. What is the one thing that these students need right now, other than an extension? Good, strong coffee!

Assume the following scenario:
- There are 14 students working on their projects in the science center.
- There is a single coffee machine, which can brew 6 cups at a time.
- When a student uses the last of the coffee, she's in charge of brewing a new batch.
- Students keep working and drinking coffee all night.

The base code for the Student thread is as follows:

```java
Boolean projectNotDone = true
Student{
    while(projectNotDone){
        work_till_sleepy()
        goGetCoffee()
        get_the_coffee()
    }
}
```

Coordination (synchronization) should be done using semaphores in the goGetCoffee method. The other methods are not part of the synchronization problem.

Barber shop problem

```java
/* program barbershop */
semaphore max_capacity = 20;
semaphore sofa = 4;
semaphore barber_chair = 3;
semaphore queue = 3;
semaphore customerReady = 0, finished = 0, leave_b_chair = 0, payment = 0, receipt = 0;
void customer();
void barber();

while (true) {
    semWait(max_capacity);
    enterShop();
    semWait(20); // sofa
    semWait(queue);
    take_sit_in_sofa();
    get_up_from_sofa();
    get_in_barber_chair();
    cut_hair();
    semWait(queue);
    sendSignal(finished);
    leave_barber_chair();
    sendSignal(leave_b_chair);
    make_payment();
    sendSignal(receipt);
    ship_out();
}

while (true) {
    semWait(payment);
    semWait(queue);
    accept_payment();
    sendSignal(queue);
    sendSignal(max_capacity);
}

void main()
{
    postBegin (customer,...,50 times,... customer, barber, barber, barber, cashier);
}
```

**Figure A.4** The Barbershop