CSCI 315 Operating Systems Design
Activity 9

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This is a *think-pair-share* exercise. First of all, work on it individually. Next, choose a couple of partners and discuss your solution. Lastly, the class will talk about it as a group.

The Sleeping-Barber Problem

Source: Problem 6.39, Operating Systems Concepts, Silberschatz, Galvin, and Gagne, *8th edition*.

A barbershop consists of a waiting room with *n* chairs and a barber room with one barber chair. If there are no customers to be served, the barber goes to sleep. If a customer enters the barbershop and all chairs are occupied, then the customer leaves the shop. If the barber is busy but chairs are available, then the customer sits in one of the free chairs. If the barber is asleep, the customer wakes up the barber.

Sketch out multi-threaded C code that uses *mutex locks* and/or *semaphores* that would guide the development of a program that coordinates the barber and the customers. You don't need to stress about the correctness of C syntax. What is important is that you determine how many mutex locks and/or semaphores are needed for coordination between threads and how barber threads and customer threads use these synchronization resources.