These questions are provided to you to help you study material covered in CS 241 that may appear on the final exam. These exact questions may or may not appear on the final exam, but the topics they cover will almost certainly be on the final exam.

1. In lecture, you saw two solutions to the Producer-Consumer problem. The first solution used two semaphores; the second solution used a single conditional variable.
   a. In the solution using semaphores, why were two semaphores used?
   b. In the solution using a conditional variable, why was **pthread_cond_signal()** sufficient and **pthread_cond_broadcast()** was not needed?

2. What does it mean if the Readers-Writers problem has a solution that has a "writers-preference"? What does this specifically mean for the readers?

3. What are three different solutions to the Dinning Philosophers problem? Identify if each solution requires any global state (eg: a global lock).

4. In the solution to the Sleeping Barber problem, how does the code ensure that only one customer is having his or her hair cut at a time?