

CSSE 332 -- OPERATING SYSTEMS

Introduction to Condition Variables

Name: _____

Question 1. Write down the API call that corresponds to each of the actions below.

- (a) (5 points) Create a condition variable
- `c`
- :

- (b) (5 points) Given a condition variable
- `c`
- and a mutex
- `m`
- , wait on the condition variable:

- (c) (5 points) Given a condition variable
- `c`
- , signal
- exactly one**
- waiting thread, if any.

- (d) (5 points) Given a condition variable
- `c`
- , signal
- all**
- waiting threads, if any.

Question 2. Consider a thread that calls `pthread_cond_wait(&c, &m)`; where `c` and `m` are a condition variable and a mutex lock, respectively.

- (a) (5 points) Describe the steps performed by the thread as it is ready to wait on the condition variable.

- (b) (5 points) Assume now that another thread calls
- `pthread_cond_signal(&c)`
- . Describe the steps taken by the waiting thread when it gets signaled.

Question 3. (5 points) In the boxes below, write down a possible implementation of `pthread_join` using condition variables.

First, list your state of the world (or concurrency state). These will essentially be your global variables.

Parent (main) thread:

Child thread: