# CS 511 – Quiz 4: Monitors

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Names:
Pledge:

## Exercise 1

There is a reservation system for a movie theater used by all its box offices (BO). The movie theater has one room. Each BO can:

- Request a reservation for a number of seats `void reserve(int seats)`. The BO cannot reserve more seats than are currently available. In any of these two cases If a BO tries to reserve more seats than are available, it should block until there are enough seats to perform the reservation. Note: you may assume that it never happens that more seats are reserved than those that are installed in the room.
- Cancel a number of seats (making them available) `void cancel(int seats)`. Note: you may assume that one never cancels seats that were not previously reserved.

You may assume that only a positive number of seats may be reserved or canceled. Also, you must assume that the monitor uses the $E = W < S$ strategy.

1. Implement a monitor `MovieTheater` so that BOs can make seat reservations and cancelations. You may use condition variables. The operation `c.signalAll()`, for `c` a condition variable, may be handy: it puts all the processes in its associated queue in a READY state.
2. *(extra-credit)* Extend the monitor with new operations `startProjection()` and `stopProjection()`. The former blocks in case the room is not full (i.e. when there are seats available). Once it is full, `startProjection()` must unblock and start projecting the film. All pending reservations must be dropped and return `false`. The `stopProjection` operation should free all seats. Also, `cancel` should have no effect if the film is being projected. Note: modify all the necessary operations of the monitor.