Assignment 6

Due: 9:00am, Thu Mar 8th, 2018

Note: Make reasonable assumptions where necessary and clearly state them. Feel free to discuss problems with classmates, but the only written material that you may consult while writing your solutions are the textbook and lecture slides/videos. Solutions should be uploaded as a single pdf file on Canvas. **Show your solution steps** so you receive partial credit for incorrect answers and we know you have understood the material. Don't just show us the final answer.

1. Draw the finite state table and the finite state diagram for the sequential circuit that implements the following function in a self-driving car. In every second, the car's position within the lane is determined with cameras and fed as input to the sequential circuit. Accordingly, the car's steering wheel is moved to one of 2 positions: Left, Right. The car itself can be "Middle of a lane", "Drifting to the right edge of the lane", and "Drifting to the left edge of the lane". If the car is in the "Middle", the steering position is left unchanged. If the car is drifting to the edge of the lane, the steering is moved away from the edge. **(50 points)**

2. Construct a finite state table and diagram for the following home alarm circuit. Any time the user punches in an invalid code, the alarm state remains unchanged. The alarm toggles between Active and Disabled states when the user punches in a valid code. If the alarm is in Active state and the motion sensor is triggered, the alarm goes into a Panic state; it moves from Panic to Disabled when the user punches in a valid code. If a valid code is received in a cycle, the finite state machine behaves as if the motion sensor is untriggered (even if the motion sensor is triggered). **(50 points)**