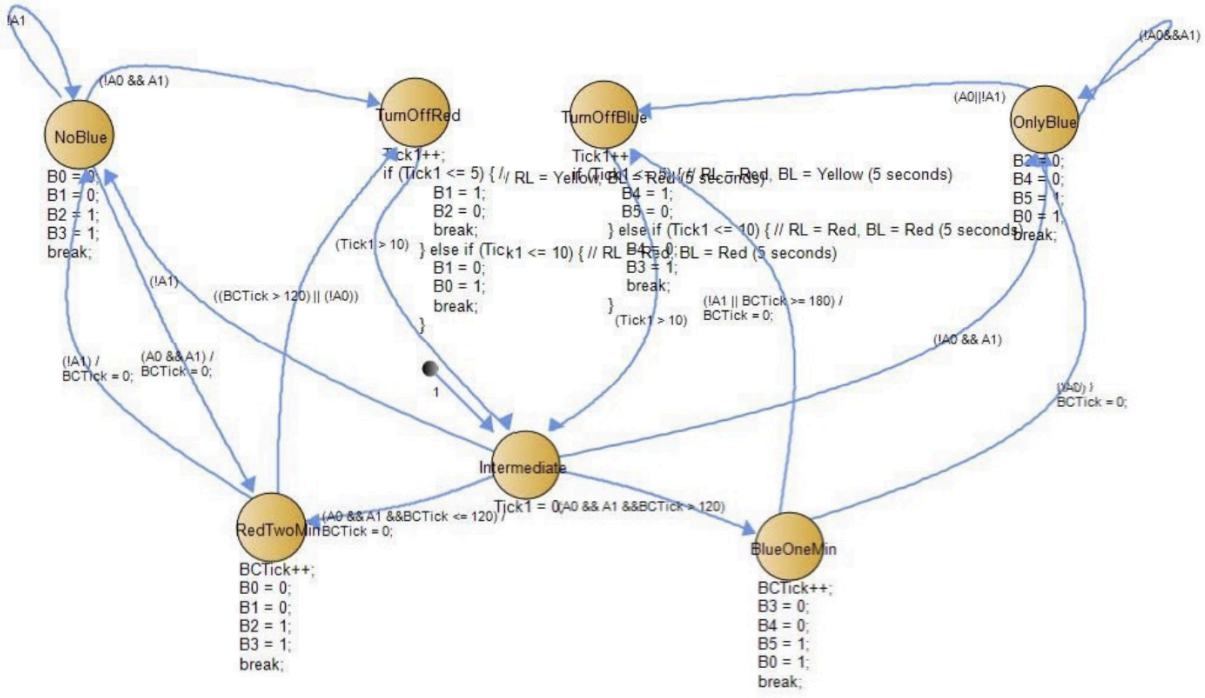
Lab 3 Writeup



Exercise 4: short video demonstrating the ultrasonic sensor returning distances as expected

https://drive.google.com/file/d/14zavTZ28oQ4D0gHuNjMX5kSwSUyOyQPw/view?usp=sharing

Exercise 5: about a paragraph describing your characterization

We chose to measure distance in terms of centimeters and thought it would be the best practice that could be scaled easily. The further we got away from the sensor, it could accidentally pick up on other items in the way and disrupt the detection. But there was a sweet spot in detecting the paper from about 1 cm to 10 cm. The sensors seemed to detect distances differently, so we had to choose different detection distances for each. We chose for our main road that if a “car” was less than 2.5 cm away then it would think a car is present. We then chose for a blue car to be detected when an object is less than 8 cm away to account for the difference in measured distance between each sensor. Ideally, we would be able to calibrate both sensors so they more accurately match with reality, but for our use case, it was not extremely important.

Exercise 6: video documenting full functionality as expected (give an example from all four cases of inputs from the two sensors, and document the transitions as appropriate). Include a discussion of about one paragraph about how such a system might be implemented in practice.

Ideally were were trying to create a simplified model of a traffic system at an intersection. While we are detecting “cars” at such a small distance the sound pulse from the ultrasonic sensor works. However, in a more complex intersection or to detect actual cars we may switch up the type of sensors used. Our state machine works well in allowing the main road to get the majority of the time since that’s where the traffic is. However, we may want to use lidar detection or some sort of road induction loop sensors that act as pressure plates to know when a car is coming up at the intersection. These types of sensors would have fewer errors in detecting the distance of a car to cycle through the different states and can be expanded to more roads and cars more safely.

Vid:
https://drive.google.com/file/d/1W1zM92gFh3sTPXWMCHKCkKzMNf-GtFS9/view?usp=drive_link