2021 Fall ELG 5142 Ubiquitous Sensing and Smart City Assignment One -- Traffic Light

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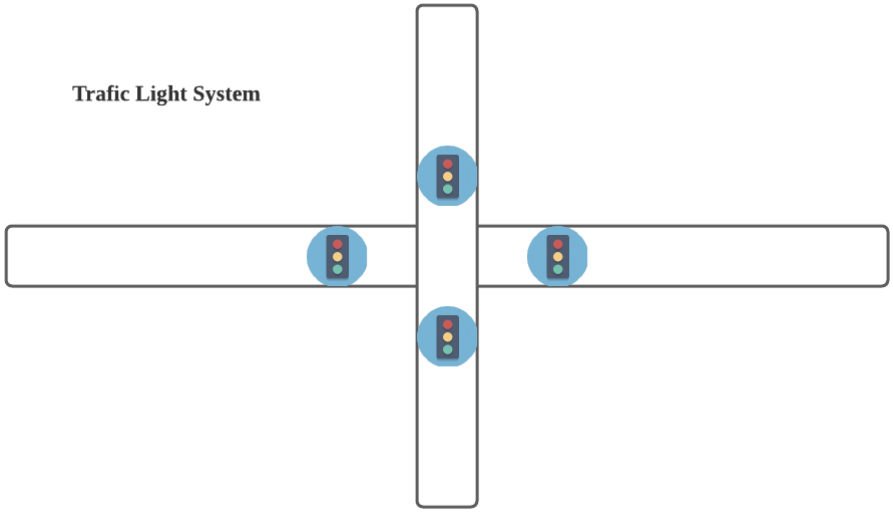
Submission Deadline: Friday, October 1st, 2021, 6:00PM

Assignment one is based on the LED example and the Counter example in tutorial two.



Background: Assume that we are standing at an intersection. There are a total of four directions of traffic passing the intersection. In order to maintain the smooth flow of traffic, we need four signal lights to indicate the passing traffic. When the red light is on, vehicles should be prohibited from passing. When the green light is on, vehicles can pass.

Please combine the LED and Counter in tutorial two to design a traffic light system.

1. The system contains four traffic lights. Each traffic light is in charge of one direction.
2. The green time of each traffic light is 5 seconds, and the red time is 5 seconds as well. The red and green color glow alternately.
3. The four traffic lights should be divided into two groups (opposite direction should be in the same group). For example, the east-west direction is a group, and the north-south direction is a group. The color of each group should remain the same at all times. The color of different groups should be different at all times. For example, when the east-west direction is green, the north-south direction should be red.
4. Every second, the traffic light should also output the remaining time of the current color.

Grading Scale:

1. Demonstrate how you implement the LED and Counter separately.
2. How do you combine them together to achieve the traffic light system?
3. Provide a screenshot of your traffic light system.
4. Append your source code, including the "Makefile" , at the end of your assignment.
5. PDF version is the best~