Name: ___________________________

Class:____________________________

Module 4: Traffic Signal Design
Lesson 1: Traffic Signal (Arduino) Control System
Traffic Signal Lab Report & Data Collection
Grade 9 - 12

Introduction

In this lab report you will be collecting basic data about an intersection. Traffic volume is one of the many factors that transportation engineers use to evaluate an intersection.

Observations

List your initial observations about the intersection your class is researching. Be sure to include if you observe any intelligent transportation systems such as, traffic cameras, signs, wire loops in the pavement. Other notable elements include number of lanes per approach and lane use (e.g., one left turn lane, two through lanes, one shared through-right lane, presence of bicycle lanes, etc.), orientation of signal heads (e.g., one signal head per lane), signal indications on each signal head (e.g., red-yellow-green arrow), how traffic is flowing, confusion or frustration by any road users (including pedestrians), crashes that occurred or that nearly happened, and other pertinent information. Also record the date, time, and environmental conditions (i.e., rain, fog, sun glare, etc.) at the time of observation.

Hypothesis

Form a hypothesis about traffic volume and direction at your intersection. Example: northbound through traffic is congested for approximately 15 minutes between 8:15-8:30am on weekdays.

Experiment & Data Collection

Procedure:

1. Your teacher will assign your group 2 approaches to the intersection to monitor. Collect your data at your assigned position (i.e., sidewalk or grassy area) using the following tables. Later, you will get the data from the other 2 approaches from your classmates when you return to the classroom.
2. Tally the number of vehicles in 5 minute increments, traveling straight through the intersection, performing a left-turn, right-turn, and U-turn.
3. When you return to the classroom, share your data with the class data. Fill in the missing data from the other 2 approaches.

Data Table 1:
Eastbound Approach

Time (30 minutes) Start time: End time:	Left-turn Number of vehicles	Through Number of vehicles	Right-turn Number of vehicles	U-turn Number of vehicles	Total vehicles	Pedestrians or Bicycles (moving parallel to the traffic)
0 -5 min						
5 -10 min						
10 -15 min						
15-20 min						
20 -25 min						
25-30 min						

Data Table 2:
Westbound Approach

Time (30 minutes) Start time: End time:	Left-turn Number of vehicles	Through Number of vehicles	Right-turn Number of vehicles	U-turn Number of vehicles	Total vehicles	Pedestrians or Bicycles (moving parallel to the traffic)
0 -5 min						
5 -10 min						
10 -15 min						
15-20 min						
20 -25 min						
25-30 min						

Data Table 3:
Northbound Approach

Time (30 minutes) Start time: End time:	Left-turn Number of vehicles	Through Number of vehicles	Right-turn Number of vehicles	U-turn Number of vehicles	Total vehicles	Pedestrians or Bicycles (moving parallel to the traffic)
0 -5 min						
5 -10 min						
10 -15 min						
15-20 min						
20 -25 min						
25-30 min						

Data Table 4:
Southbound Approach

Time (30 minutes) Start time: End time:	Left-turn Number of vehicles	Through Number of vehicles	Right-turn Number of vehicles	U-turn Number of vehicles	Total vehicles	Pedestrians or Bicycles (moving parallel to the traffic)
0 -5 min						
5 -10 min						
10 -15 min						
15-20 min						
20 -25 min						
25-30 min						

Lab Report

Your lab report should contain the following sections:

1. Introduction and Hypothesis
2. Calculations
3. Results
4. Discussion
5. Conclusions

Answer these questions in paragraph form within your lab report.

1. Based on your data collection, evaluate the intersection. Were you able to identify the signal timing (how much time for green, yellow, or red)? In your opinion, does the intersection operate efficiently and safely? Does it accommodate all road users (vehicles, pedestrians, bicyclists, etc.)? How can the intersection be improved?
2. How do intelligent transportation systems play a role in the traffic signal design and operation?
3. Based on your data, was your hypothesis supported or not supported. Explain.