# The Simulation of Traffic Patterns and the Optimization of Traffic Lights

## by Gregg Tabot
## TJHSST Computer Systems Lab 2005 - 2006

## Background Information:

Traffic lights are essential to the commuter patterns on major roads and highways today. Many drivers have experienced the operation of a single traffic light that has either delayed or advanced drivetime. With increased traffic congestion the challenge of efficiently operating traffic lights becomes a greater concern. My project is to find a useful algorithm for the operation of traffic lights to advance drivers as quickly and efficiently as possible. This simulation or modeling program takes into account two heuristics: the number of cars on the road and the particular situations at various time increments of cars waiting to advance in lanes under observation.

## Project Description

My project allows simulation of traffic using three different strategies: Manually, Timed, and Frequency Formula - a method I created for this project's analysis. The Manual Method allows the designer to switch the traffic lights manually. The Timed method switches the lights after a preset period of time. The Frequency Formula method is an autmatic switch taking into account the number of cars on the road at the time.

## Different Methods

**Manual method:** A method based on user input meaning it switches lights when told to do so.

**Timed method:** Compares the amount of time a light has been green with the light timer option set. If the amount of time a light has been green is greater than or equal to the light timer option this light switches.

**Formula method:** If the flowing traffic frequency of the stopped cars multiplied by a timer is greater than or equal to the stopped traffic frequency multiplied by the quantity of the timer subtracted from maximum wait time, the light switches.
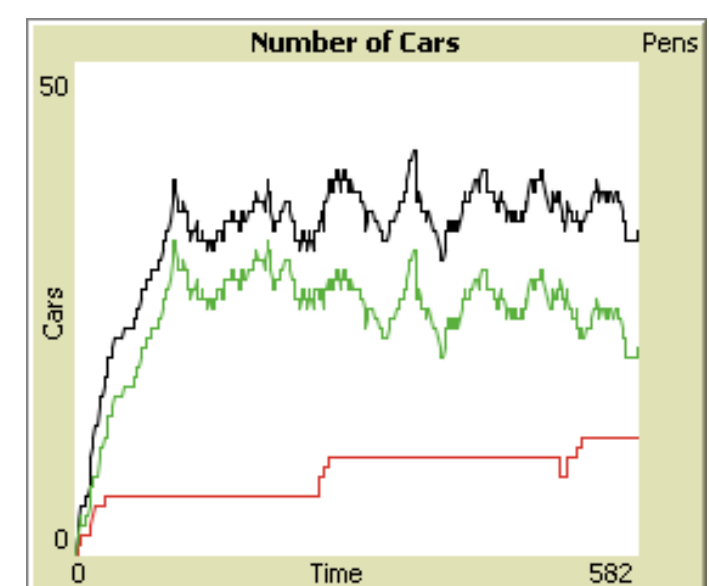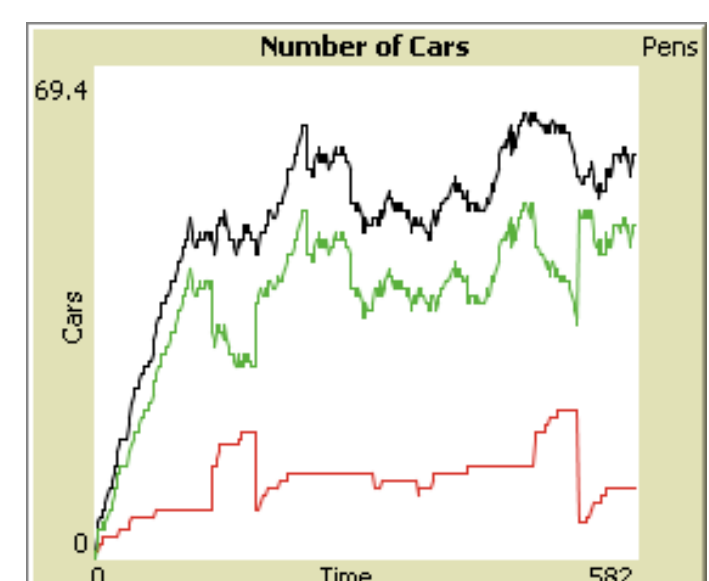
## Graphic Outputs

Black: Total Cars
Green: Moving Cars
Red: Stopped Cars
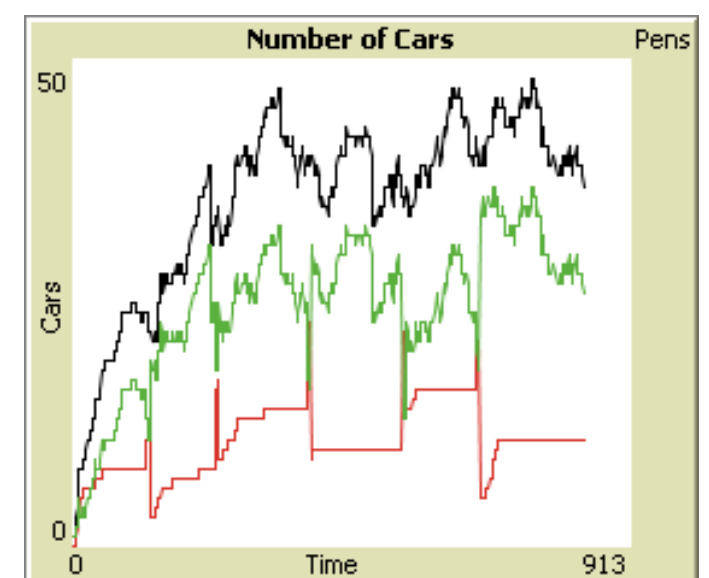
**Manual Method**

**Timed Method**

**Frequency Formula Method**