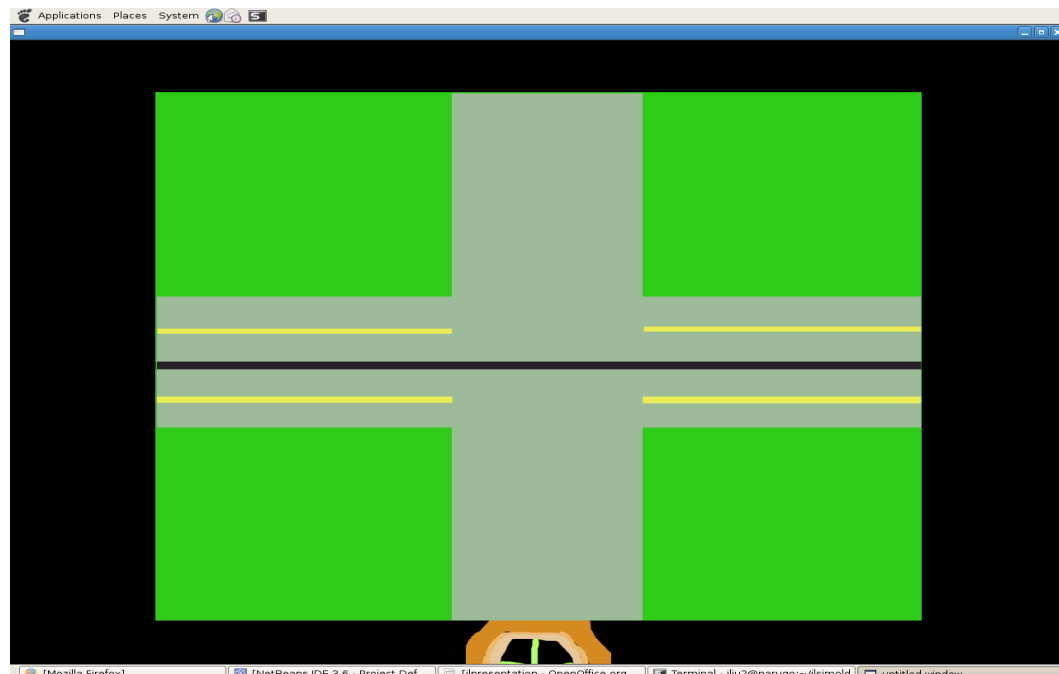
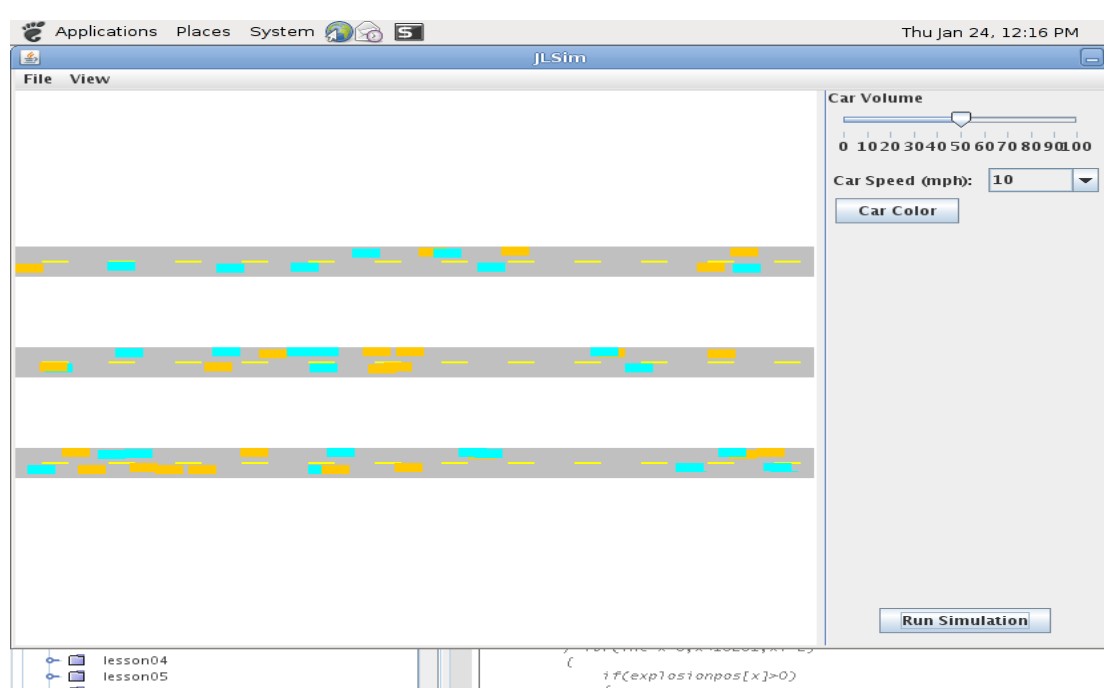


# JLSim: Visual Traffic Simulation Application with Extensive User Interface

## Jinyu Liu Pd. 3



Initial Prototype  
(C/OpenGL/GLUT)



2<sup>nd</sup> Quarter  
Prototype (Java)

## Procedures and Methodology

-> Resources required: Netbeans Java IDE, JGrasp, Java SE, Java JRE.

-> Programming language: Java

The main procedure will include developing from a simple prototype, a 800x600 application window with the basic JMenu, JPanel and GUI options at the right. Functionality will be implemented step-by-step for the application. This allows for easy simultaneous testing of the program.

The main program will be divided into three classes: TrafficDraw, Car, and TrafficLight. The TrafficDraw class is the main class that handles both the visual and underlying implementation of the program. Here, the program updates objects in the simulation during each frame and repaints. In addition, TrafficDraw handles all the user-defined variables and any output requested by the user. The Car class defines the Car object and allows users to define specific variables for each Car object such as starting position, color, size, specific pre-set car, velocity, acceleration, and orientation (whether a car moves horizontally or vertically).

## Expected Results:

- Realistic simulation of real world traffic behavior.
- Extensive user interface to change program variables and design road networks.
- Crash analysis with independent probability calculations.(not reached)
- Design mode for developing road networks.(no design mode, but design of simple road network is possible through adding roads using the GUI provided).

## Abstract:

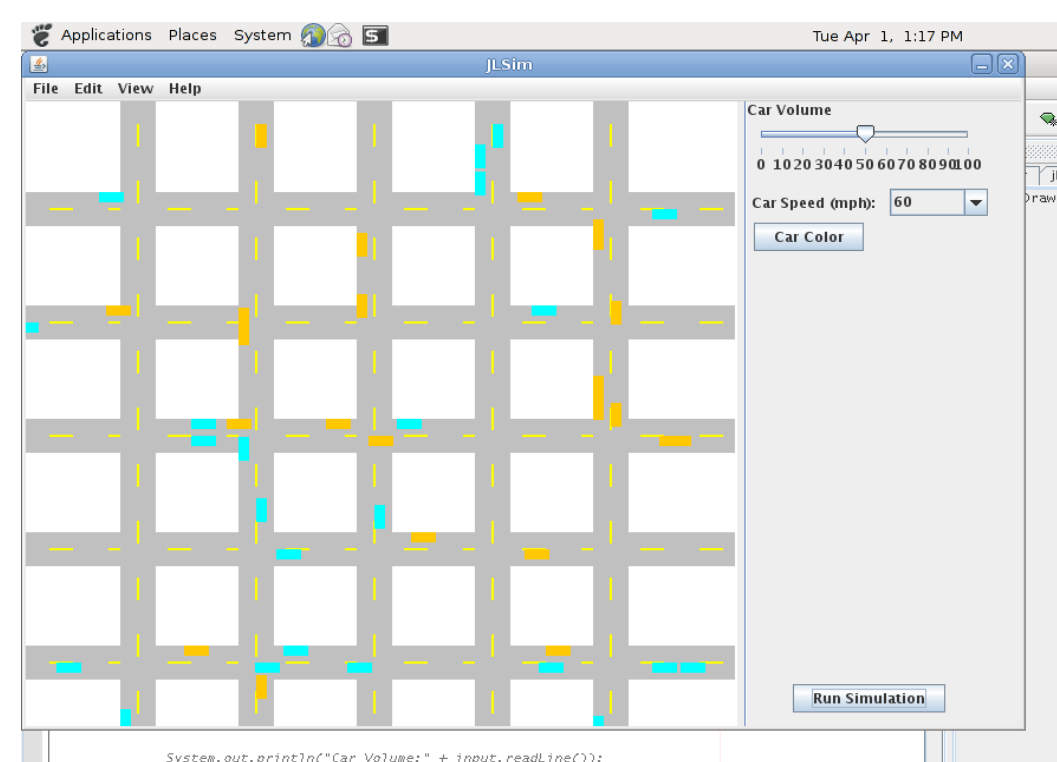
A project in this field is called VISSIM, created by Tom Fotherby. This is an extensive project written in 11,000 lines of Java code to produce traffic simulation using a microscopic approach. The finished application should be able to at least somewhat realistically simulate real world behavior of traffic. Therefore, the primary goal of this project is to provide an accurate simulation of real world traffic behavior for multiple settings based on user-defined data. VISSIM also included a pretty powerful design mode, where the users could place roads onto a grid and essentially create scenarios by themselves. Currently, a design mode is not in the plans as it would take quite a bit of time but I am planning to implement loading and saving scenario files based on the current situation at the point of saving or loading.

The primary goal of JLSim is to provide high customizability on the user-end. Many web applets have decent traffic simulations, but they offer minimal user interaction. The other primary goal is to provide an accurate simulation that reflects similarly to what would actually happen in the real world.

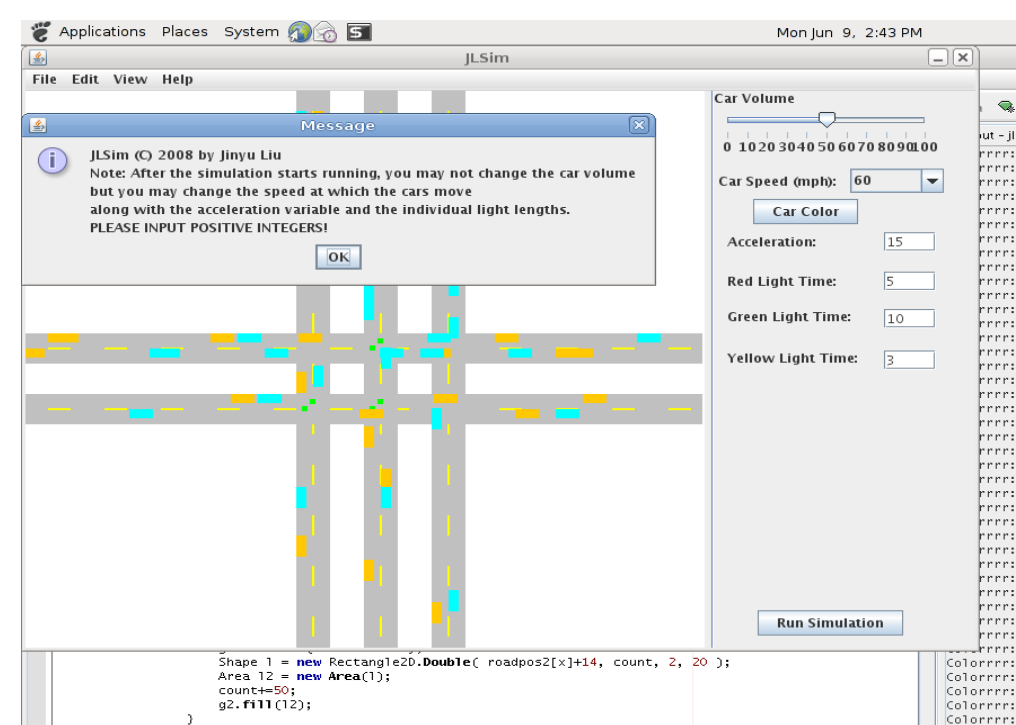
## Background/Specification:

Written in Java, this application will use the Java swing class to implement to user interface. The program will be divided into two halves, the left half being the visual part of the simulation and the right part being the extensive user interface where users can change program variables such as number of cars and traffic light length. (basic layout seen in screenshots)

In contrast to macroscopic traffic simulation models, microscopic traffic simulation models simulate single vehicle-driver units, thus the dynamic variables of the models represent microscopic properties like the position and velocity of a single vehicle. In addition, the "cars" are generally represented by simple geometric shapes rather than actual 3D car objects or 2D car sprites. Allows for a large number of car objects to be on-screen at the same time and to be dynamically updated.



3<sup>rd</sup> Quarter  
Prototype



4<sup>th</sup> Quarter  
Prototype