

Project Deliverable Final Report

1-Project Directory:

<C:\Users\Owner\Desktop\FinalProjectDeliverable\FinalProjectDeliverable\build.xml>

2- Screen Shot Showing project compile, test, and run:

- Test: Fail=0
- Project compile
- Project run

Buildfile:

<C:\Users\Owner\Desktop\FinalProjectDeliverable\FinalProjectDeliverable\build.xml>

build-subprojects:

init:

build-project:

[echo] FinalProjectDeliverable:

<C:\Users\Owner\Desktop\FinalProjectDeliverable\FinalProjectDeliverable\build.xml>

build:

UtilTEST:

[junit] Running project.random.UtilTEST

[junit] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.082 sec

IntersectionTest:

[junit] Running project.model.IntersectionTest

[junit] Tests run: 2, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.093 sec

RoadTest:

[junit] Running project.model.RoadTest

[junit] Tests run: 3, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.103 sec

CarTest:

[junit] Running project.model.CarTest

[junit] Tests run: 5, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.089 sec

BUILD SUCCESSFUL

Total time: 3 seconds

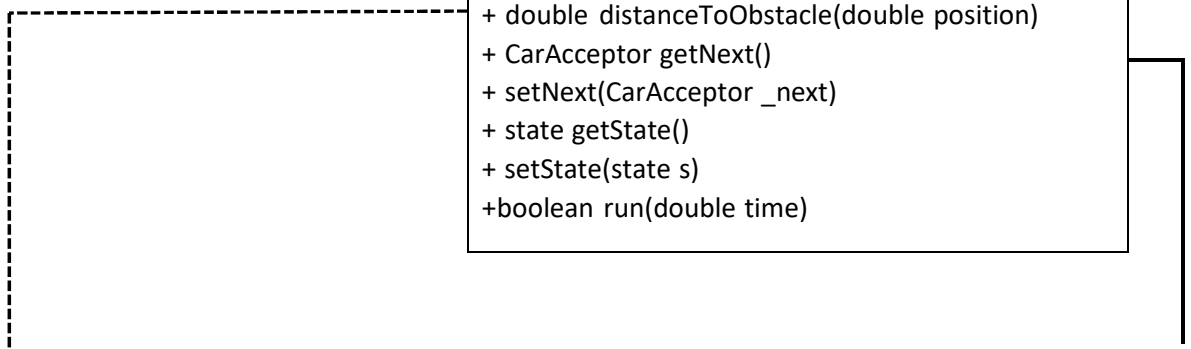
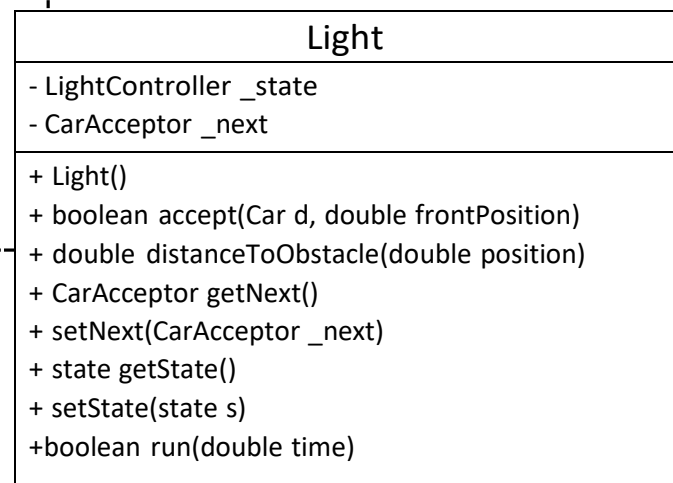
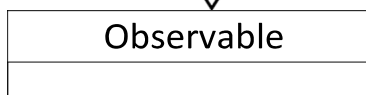
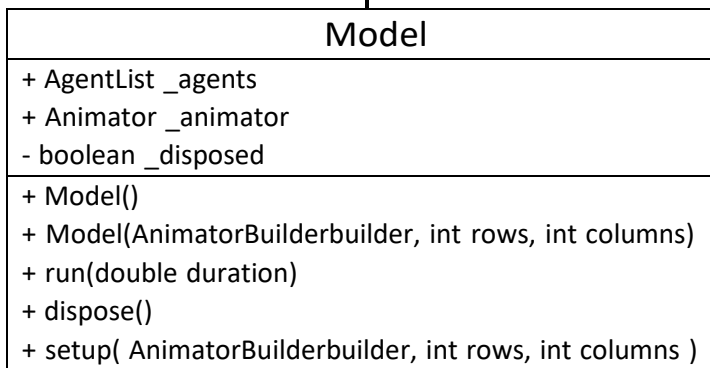
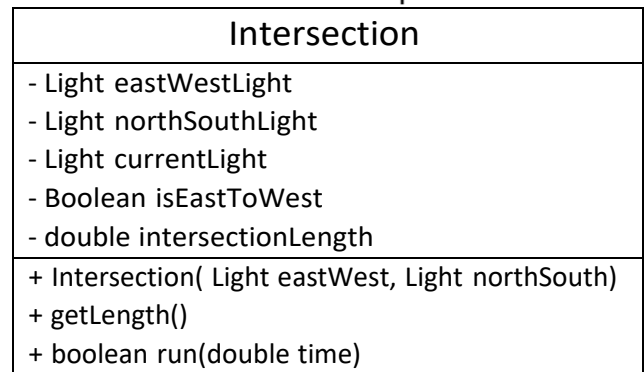
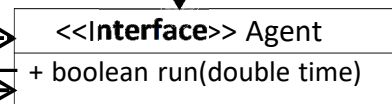
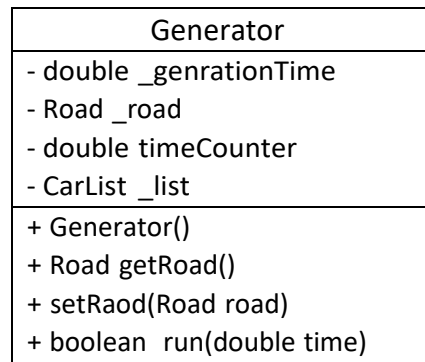
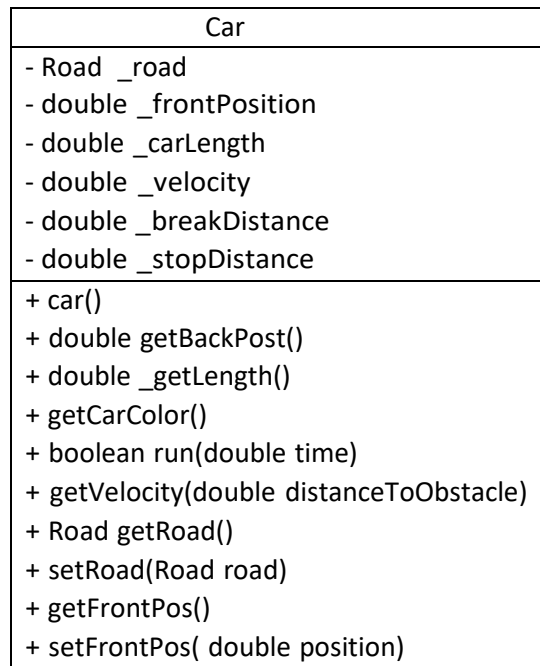
3-Timesheet:

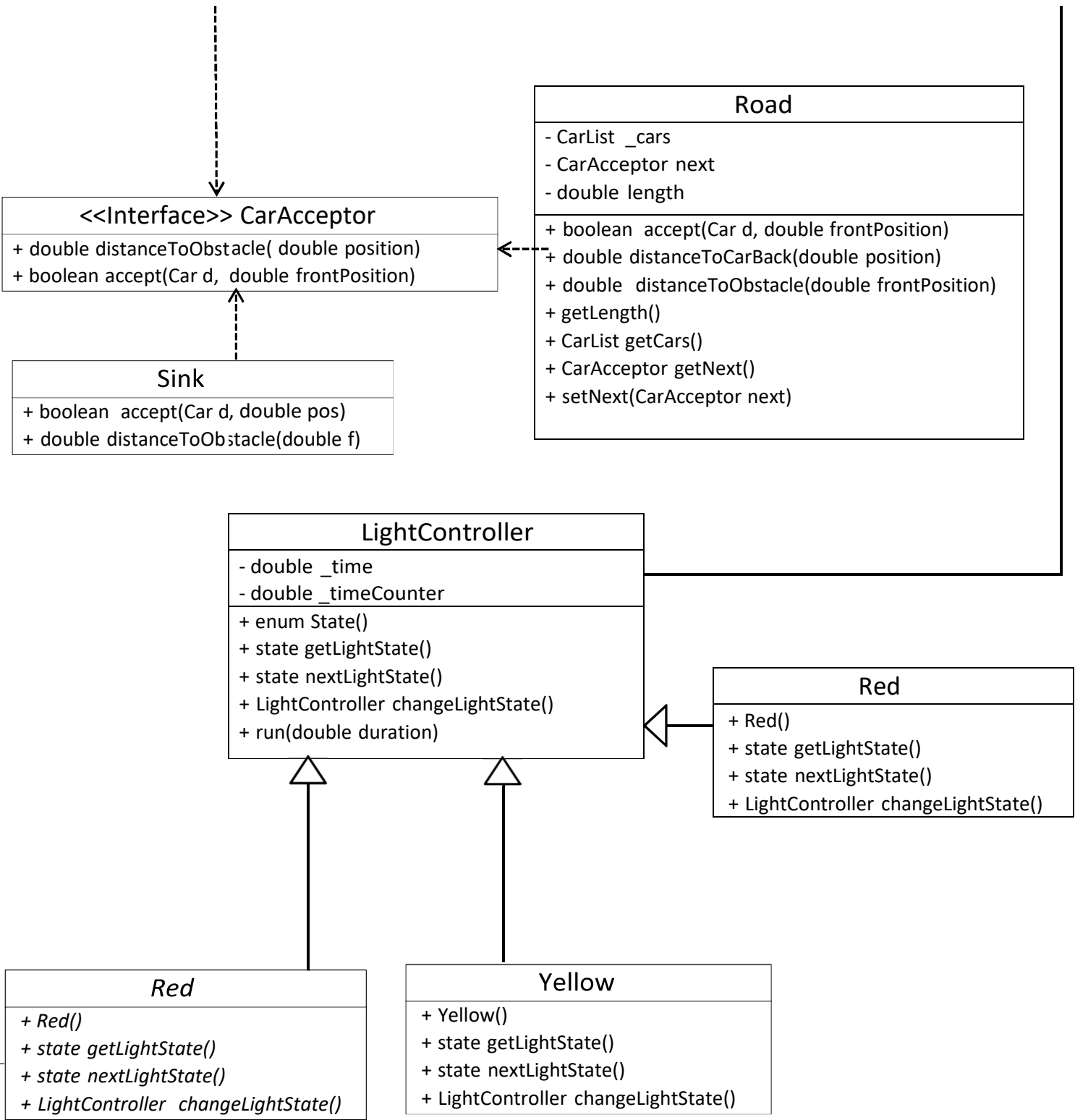
Week	01	02	03	04	Total
Coding	6	18	15	12	51
Design	4	9	4	5	22
Bigbug	3	6	3	6	18

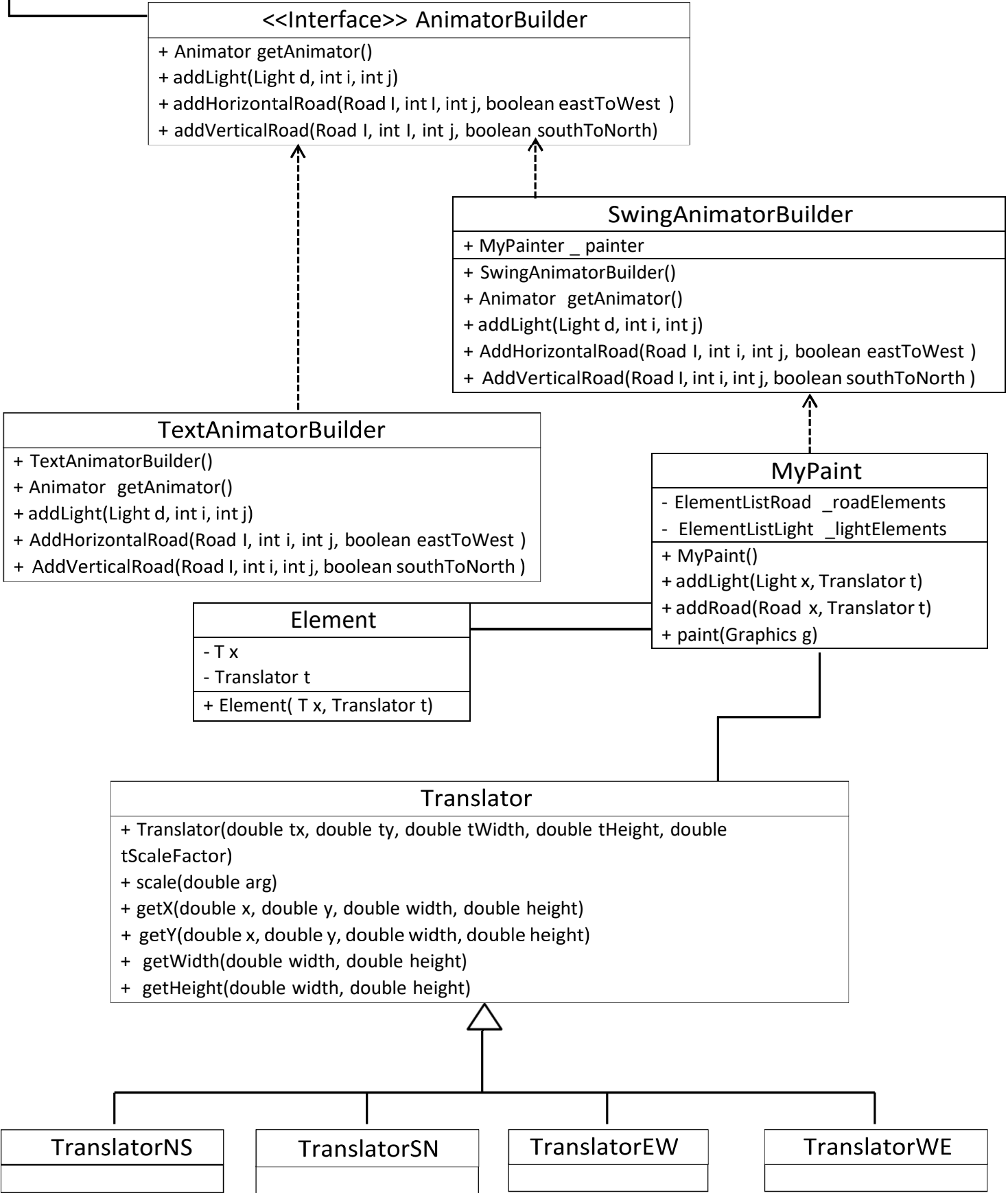
4-Class Diagram:

Interface: Agent, CarAcceptor, AnimatorBuilder

Classes: Model, Car, Generator, Intersection, Model,Road, Sink, Light(lightController(Red,Yellow,and Green)), SwingAnimatorBuilder, and TextAnimatorBuilder.







5- Design Pattern:

- State pattern:

The intent of this pattern is to allow an object to alter its behavior when its internal state changes, the object will appear to change its class. It is known as object for states. The State Pattern is used when object behavior depends on object state and I want to avoid complex if-else statement. So, I used this pattern to control the intersection light in each road. I assigned the light to be at the green state, then it is changing to the yellow state for a moment of time, and finally the light state will be assigned to the red color. The process will be repeated again by assigning light state to the green color. The abstract class that control the light to be changed is lightController which it is using changeLightState().

- Builder pattern:

The pattern allows a client object to construct a complex object by specifying only its type and content, being exposed to the difficulty from the details related to the object representations. This way the construction process can be used to create different representations. The logic of this process is isolated from the actual steps used in creating the complex object, so the process can be used again to create a different object from the same set of simple objects as the first one. I used an interface AnimatorBuilder and I implemented a SwingAnimatorBuilder and TextAnimatorBuilder for that interface, which going to build whether a swing or text animator.

- Strategy pattern:

This pattern is Define a family of algorithms, encapsulate each one, and make them interchangeable. Strategy pattern lets the algorithm vary independently from clients that use it. So, in this case I created interfaces Agent, and carAcceptor to my design and I have an implementation for each interface in the Car, Road classes.

- Observer pattern:

The Pattern for this case when certain objects need to be informed about the changes occurred in other objects. Design Pattern can be used whenever a subject has to be observed by one or more observers. It is to define a one-to-many dependency between objects so that when one object changes state, all its dependents are notified and updated automatically. The pattern is used in the Model class. It extends the observer class. It is considered the view in the Model-View- Controller (MVC). I made use of setChanged() and notifyObservers() method to set change and notify all the subscribers.

6-Successes and Failures:

- What does it Work:

I successfully get the cars moving without any collision. And the car moves with different colors, sizes, and speed. I perfectly succeed to create traffic light that provokes the cars to stop, move or slow down without any collision. I created test cases CarTest, RoadTest, IntesectionTest, and UtilTEST for the classes Car, Road, Intersection, and Util.

- What Does not Work:

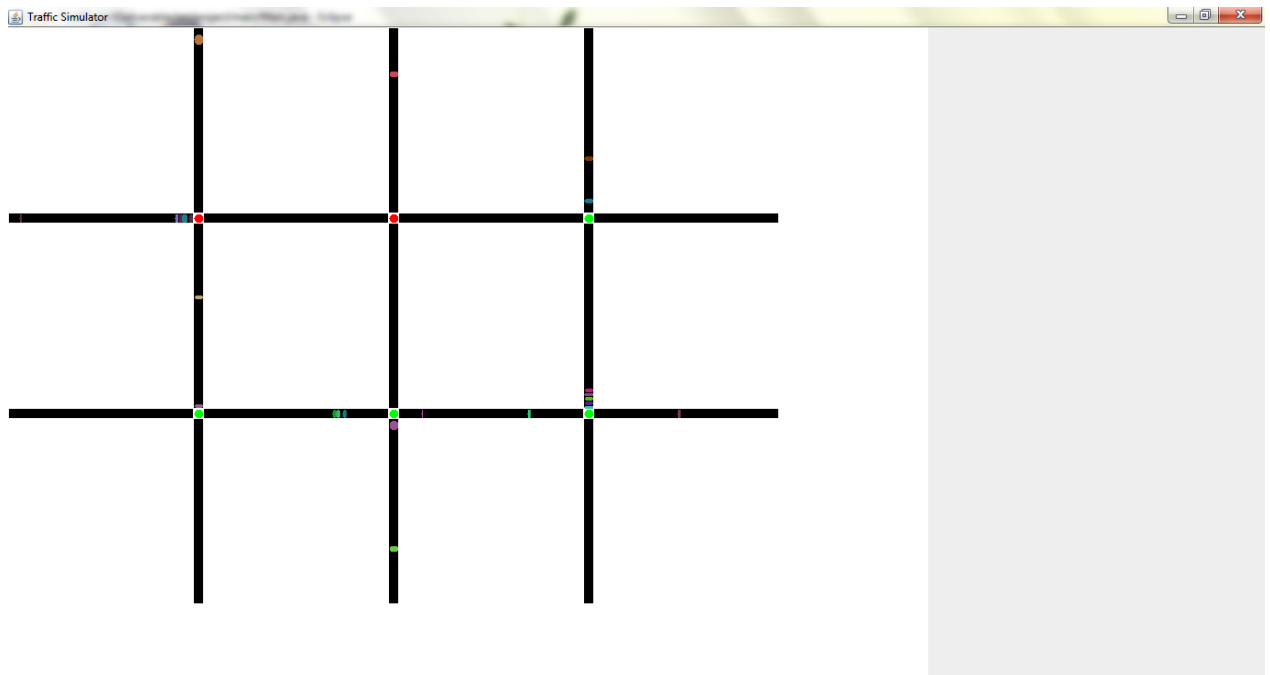
I tried to create in each intersection two traffic lights and each traffic light on that intersection change from green followed by yellow and finally red. I could not do it. But I will try to do later.

Screen Shoot of Running Program:

Enter Your Choice By Number:

1. Run Traffic Simulation
2. Change Traffic Simulation Parameters
3. Exit Traffic Simulation

1



Project Traffic Simulation

Enter Your Choice By Number:

1. Run Traffic Simulation
2. Change Traffic Simulation Parameters
3. Exit Traffic Simulation

2

Change Traffic Simulation Parameters

Enter Your Choice By Number:

1. Show Current Values
2. Traffic Simulation Time Step
3. Traffic Simulation Run Time
4. Traffic Simulation Grid Size
5. Traffic Simulation Pattern

6. Traffic Simulation Generated Car
7. Traffic Simulation Road Length
8. Traffic Simulation Intersection Length
9. Traffic Simulation Car Length
10. Traffic Simulation Car Maximum Velocity
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15. Reset Traffic Simulation and Return To The Main Menu

1

```
Simulation time step (seconds)      [0.5]
Simulation run time (seconds)       [850.0]
Grid size (number of roads)        [row=2,column=3]
Traffic pattern                     [alternate]
Car Generated (seconds/car)         [min=15.0,max=30.0]
Road Length (meters)               [min=200.0,max=600.0]
Intersection length (meters)        [min=8.0,max=16.0]
Car length (meters)                [min=5.0,max=16.0]
Car maximum velocity (meters/second) [min=12.0,max=24.0]
Car stop distance (meters)          [min=0.5,max=2.5]
Car brake distance (meters)         [min=9.0,max=15.0]
Green light time (seconds)          [min=35.0,max=120.0]
Yellow light time (seconds)         [min=3.0,max=6.0]
```

Change Traffic Simulation Parameters

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Oops Error!!

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2

Traffic Simulation Time Step: [0.5]:

You Entered Invalid Input. Please Try Again.

Traffic Simulation Time Step: [0.5]:

You Entered Invalid Input. Please Try Again.

Traffic Simulation Time Step: [0.5]: 0.5

Change Traffic Simulation Parameters

Enter Your Choice By Number:

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3

Traffic Simulation Run Time: [850.0]: 850.0

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4

Rows: [2]: 2

Columns: [3]: 3

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Traffic Simulation Pattern: (simple or alternate) : simple

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6

Minimum Car Generated: [15.0]: 15.0

Maximum Car Generated: [30.0]: 30

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6

Minimum Car Generated: [15.0]:

You Entered Invalid Input. Please Try Again.

Minimum Car Generated: [15.0]: 15

Maximum Car Generated: [30.0]: 30

Change Traffic Simulation Parameters

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7

Min [200.0]: 200.0

Max [600.0]: 400.0

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8

Minimum Intersection Length [8.0]: 8.0

Maximum Intersection Length [16.0]: 15.0

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9

Minimum Car Length [5.0]: 5.0

Maximum Car Length [16.0]: 13.0

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9

Minimum Car Length [5.0]: 5.0

Maximum Car Length [13.0]: 13.0

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10

Minimum Car Maximum Velocity [12.0]: 12.0

Maximum Car Maximum Velocity [24.0]: 20.0

Change Traffic Simulation Parameters

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12

Minimum Car Braking Distance [9.0]: 9.0

Maximum Car Braking Distance [15.0]: 13

Change Traffic Simulation Parameters

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13

Minimum Green Light Time [35.0]: 35

Maximum Green Light Time [120.0]: 111

Change Traffic Simulation Parameters

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14

Minimum Yellow Light Time [3.0]: 3

Maximum Yellow Light Time [6.0]: 5

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15

Project Traffic Simulation

Enter Your Choice By Number:

1. Run Traffic Simulation
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3

Are you sure you want to exit?

Enter Your Choice By Number:

1. Yes
2. No

2

Project Traffic Simulation

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