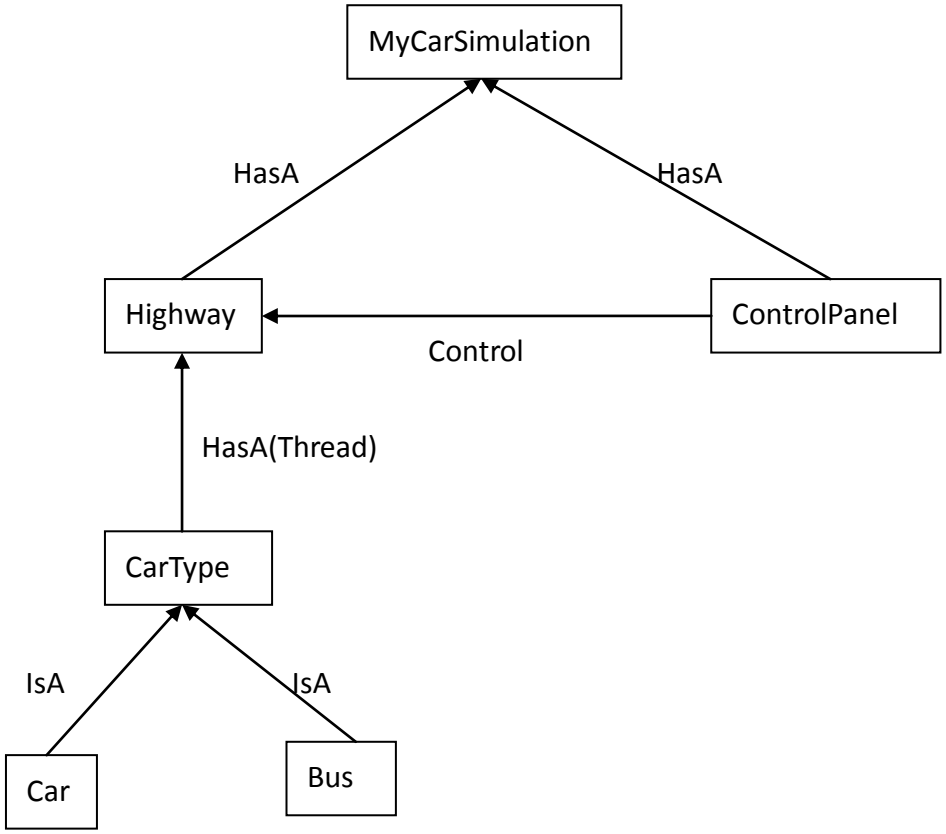
Relation:



MyCarSimulation extends Applet:

has 2 panels -> Highway, ControlPanel

Highway extends JLayeredPane:

has a function which can generate a CarType thread and can synchronize cars' status and highway status

CarType extends JButton implements Runnable:

it is a thread that can call Highway's CarRun function to move

Car, Bus extends CarType:

CarType's subclass that have different MaxSpeed, slowdownTime, speedupTime, imageURL, carWidth

ControlPanel extends JPanel:

has many jbuttons, textarea, jcombobox on it, it can control highway's status and set new cars on it.

Advantages of my design in terms of software engineering:

1. Highway be a synchronize locker that can do all synchronize things on it. So it is easy to synchronize all cars' status
2. Contribute all Highway interface on ControlPanel, separate Highway functions and its function callers. Let Highway manager cars on it only.
3. Use subtype-polymorphism on CarType, provide an easy way to add new type of car in the program.

Disadvantages of my design in terms of software engineering:

1. Add new Cartype must also add new cartype's name in Control Panel's to deal with JComboBox's needs
2. Because car is a thread and Highway only generate it but doesn't have a list to restore their reference. So it is difficult to manage all cars status, all we can do is restore a flag in Highway and let all cars check it regularly.

Advantages of my design in terms of the interestingness of the game

1. Provide a GUI to let user to set cars on the highway, and can control highway's status by Run/Stop/Restart buttons
2. Use subtype-polymorphism on CarType provides many car type to be chosen by users
3. Let cars runs using multithread can provide unpredictable result of the Simulation.

Disadvantages of my design in terms of the interestingness of the game

1. cannot dynamically add cars on the highway. The only way to add cars is add cars and press "Restart" button to restart
2.

cannot determine which type of car go on highway first. car go on highway's order depends on thread manager

Bonus:

1. have 2 types of cars: one is car, another is bus.
   car:
   has faster speed, faster reaction time and small width.
   bus:
   has slower speed, slower reaction time and longer width.
2. Can let cars go on highway in different location(different interchange)
   Also we can change highway's length
3. can set up to 5 slots to record cars number, position, cartype that can go on to the highway
4. Provide stop/run and restart buttons to let user to change highway's status

How to run:

1. type Highway length and press check to set highway length(Default is 1200)
2. Select cartype(Default is Car). type car number, interchange location.
   Press add to add this record to the slot below
3. Press Run to start simulation. Press Stop to pause it. Press Restart to reset.

Demo Website:

http://w.csie.org/~b99902022/JavaDemo.html