

Dealing With Multiple Scenarios

Course 4, Module 5, Lesson 4



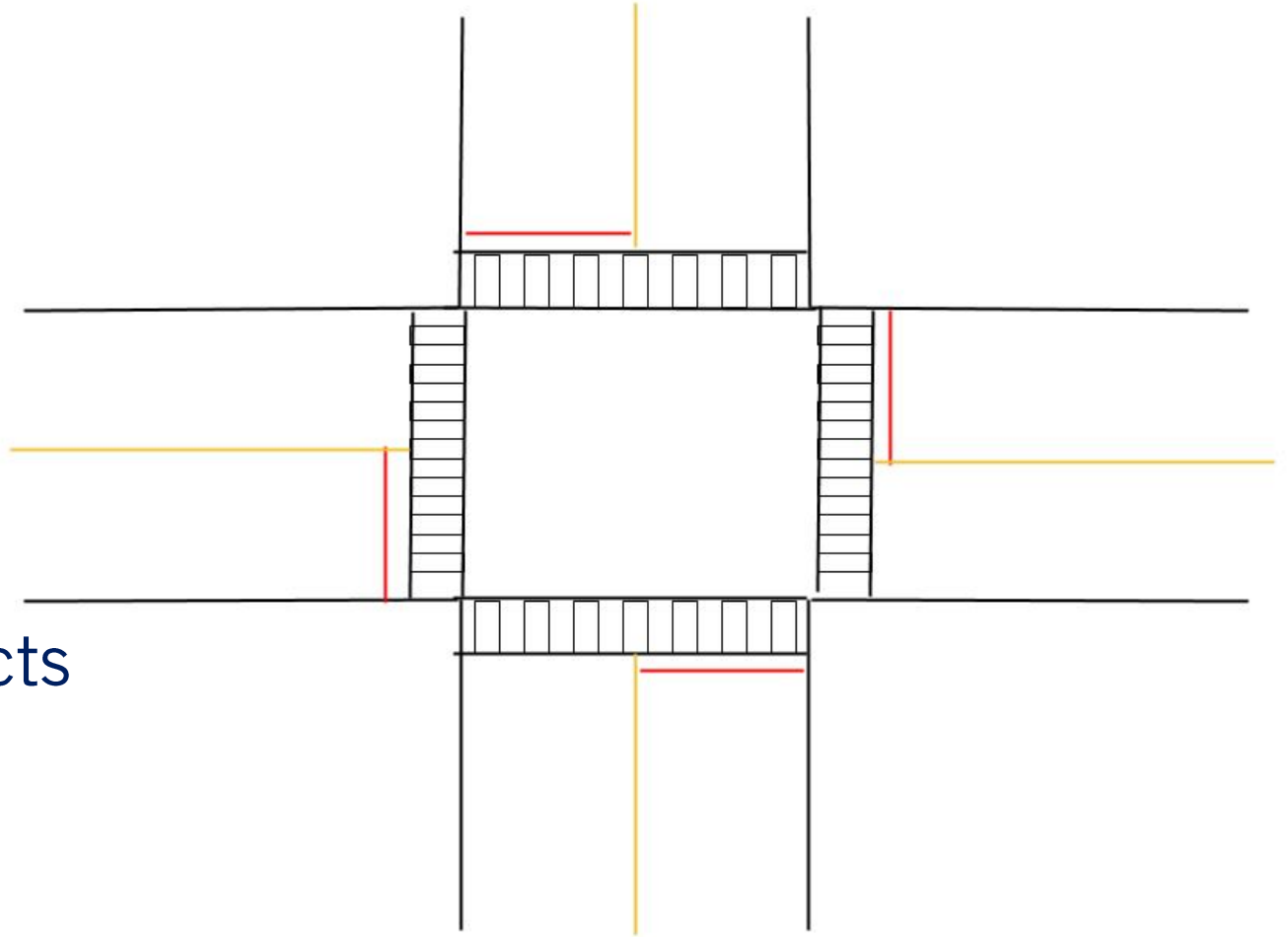
UNIVERSITY OF TORONTO
FACULTY OF APPLIED SCIENCE & ENGINEERING

Learning Objectives

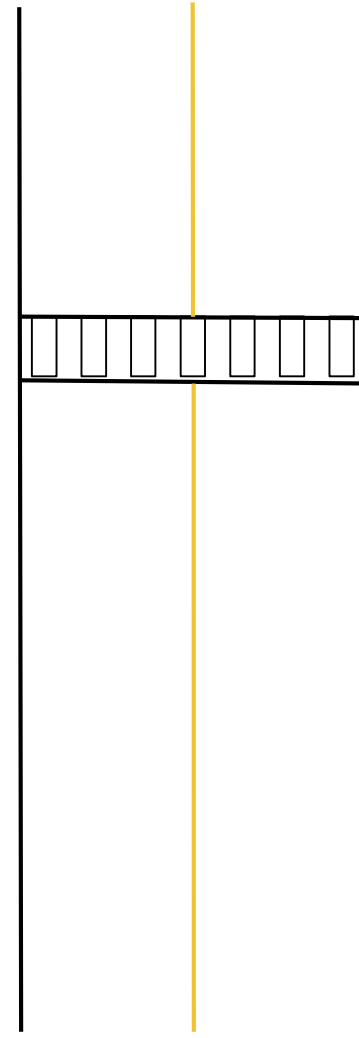
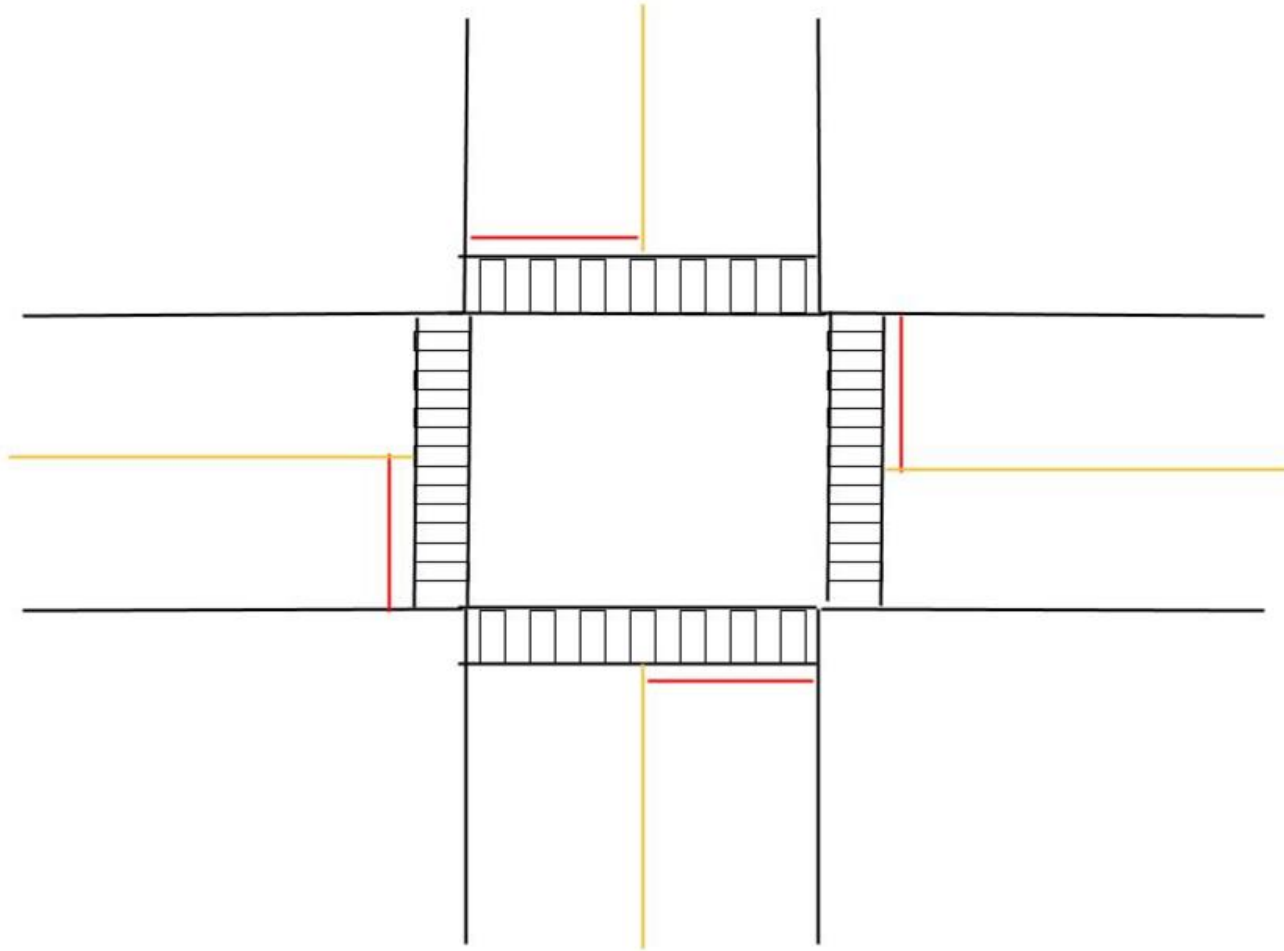
- Develop a larger overarching state machine which includes multiple scenarios
- Develop a method to switch between driving scenarios

Scenario Done So Far

- 4 way intersection
- Every direction has a stop sign
- Be able to travel:
 - Through the intersection
 - Left at the intersection
 - Right at the intersection
- Only vehicles as dynamic objects
 - 1, 2, 3 or 4 other vehicles

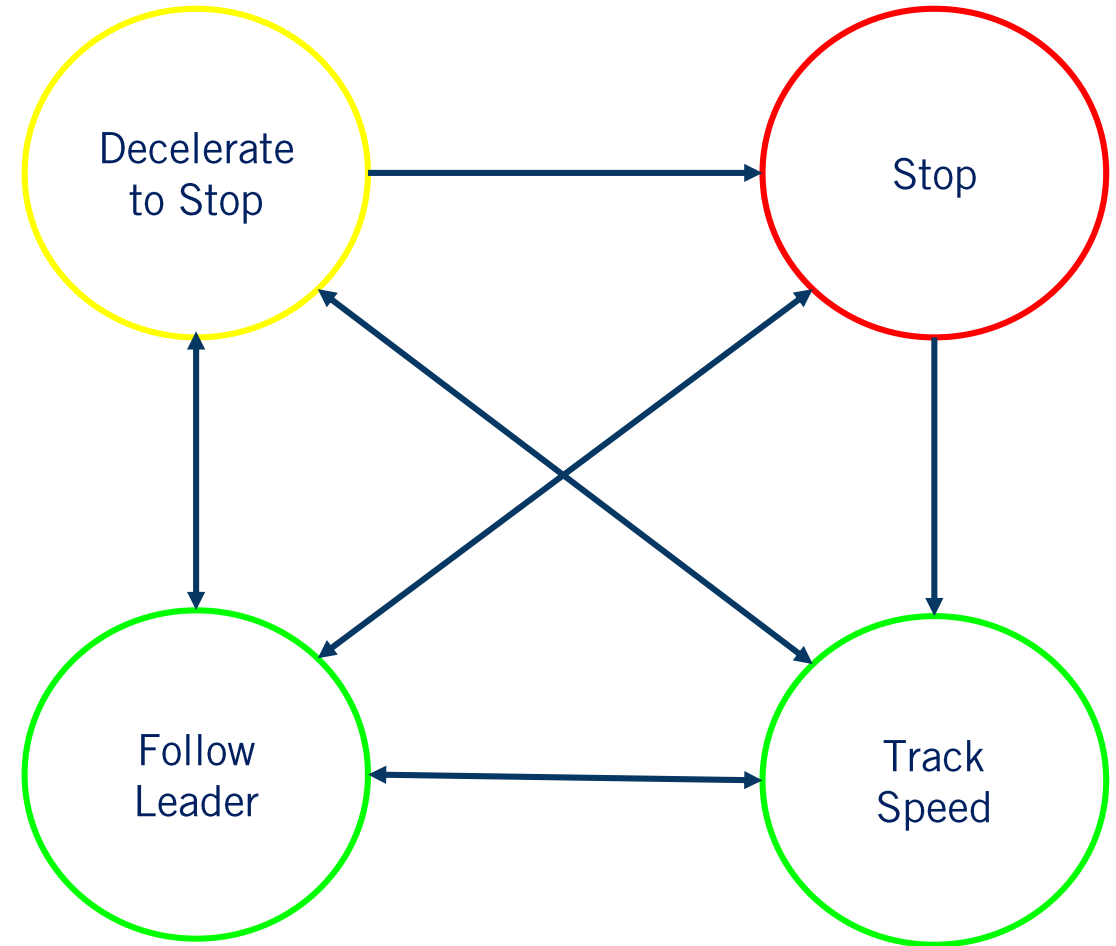


Multiple Scenarios

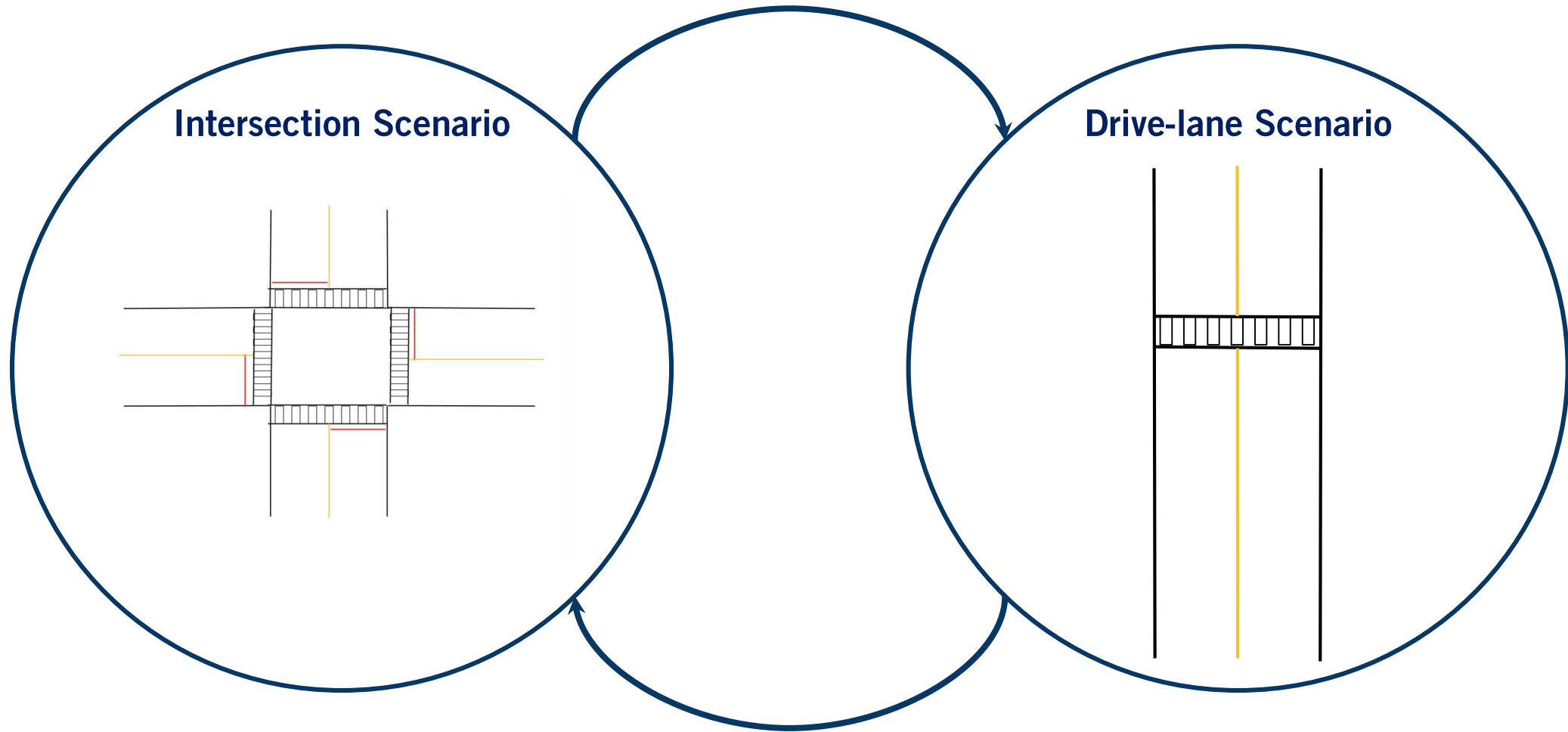


Single State Machine

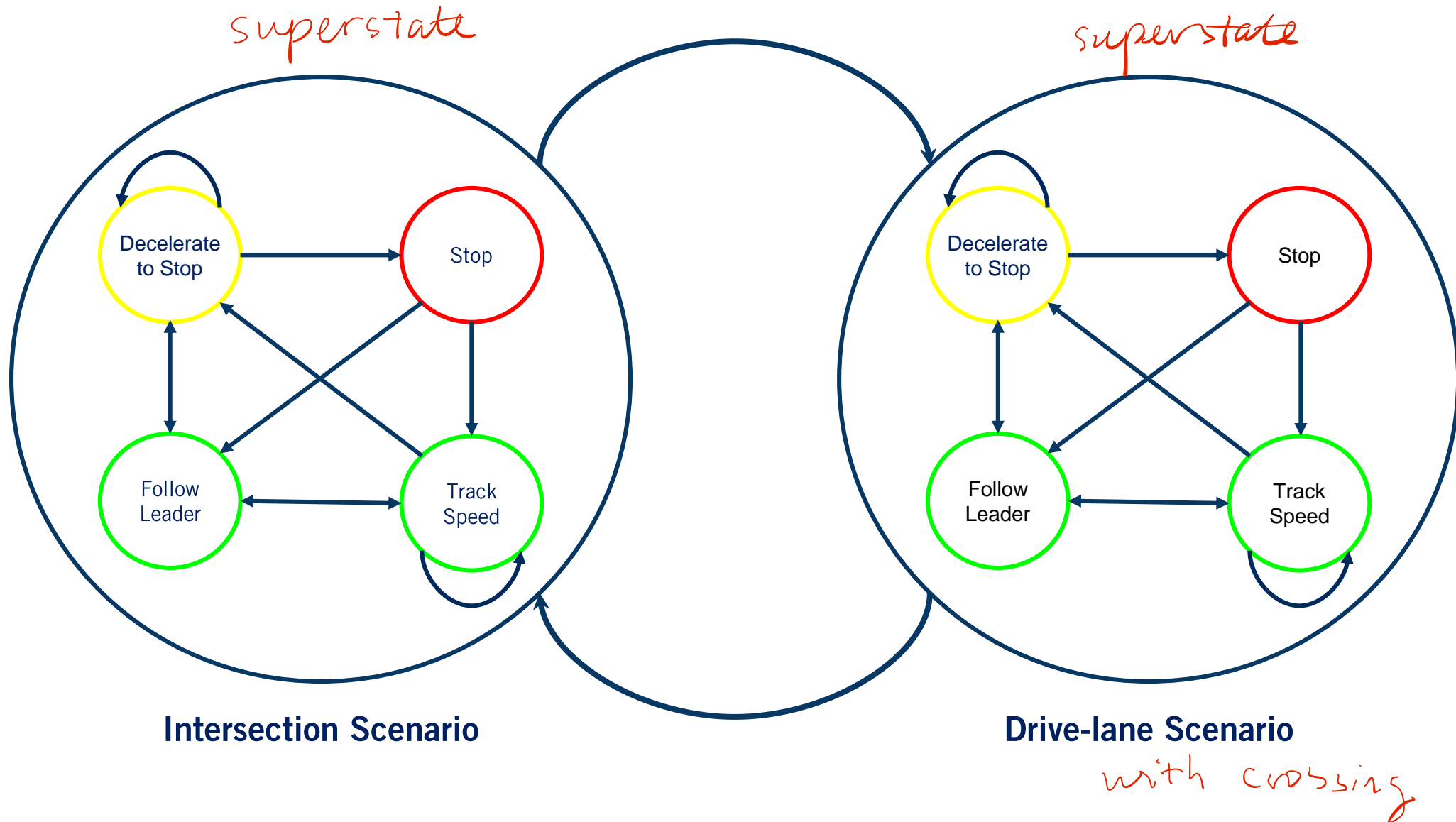
- Single state machine method
 - Add transitions
 - Add additional transition conditions
- Issues with single state machine method:
 - Rule explosion
 - Increase in computational time
 - Complicated to create and maintain



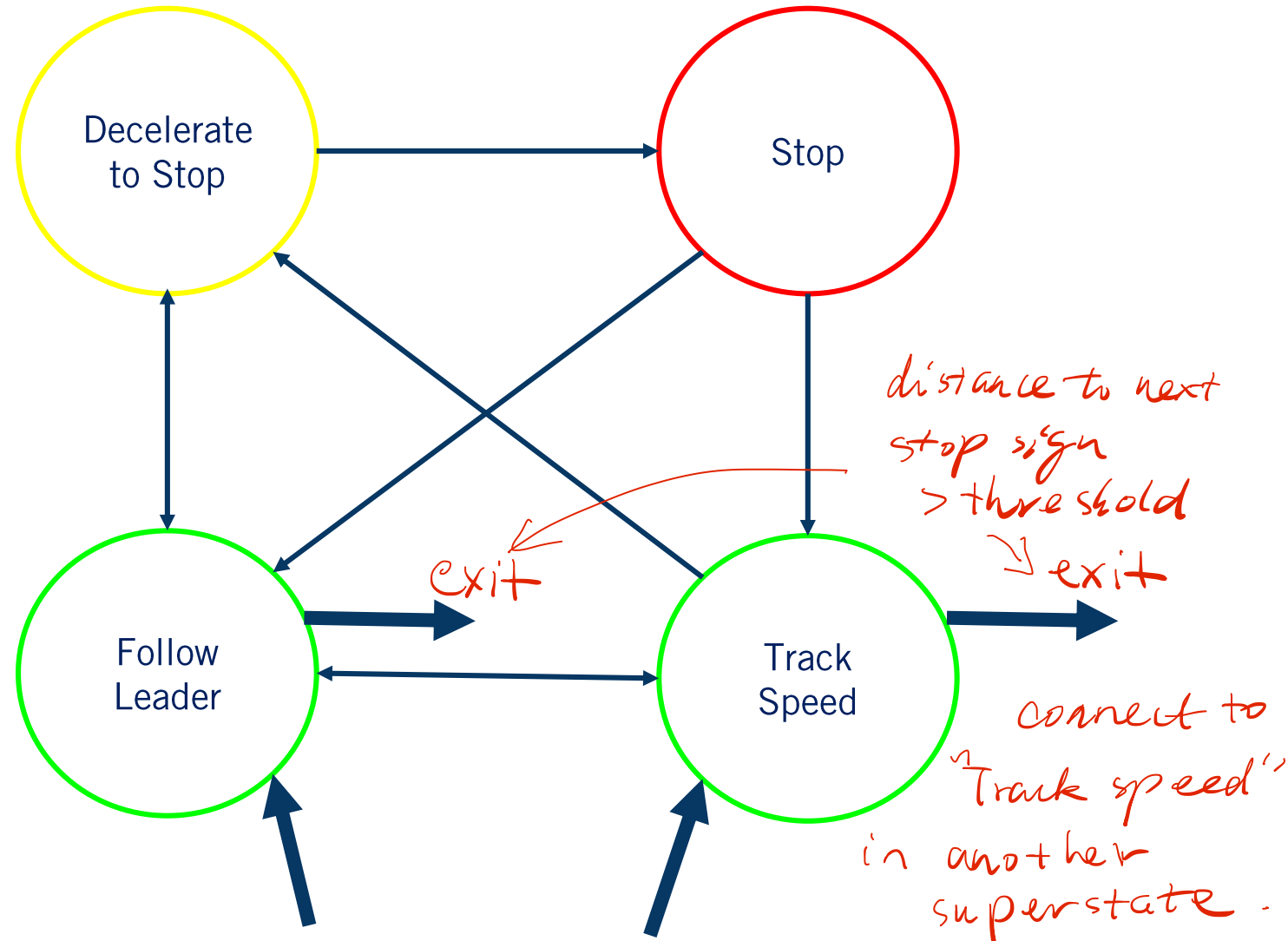
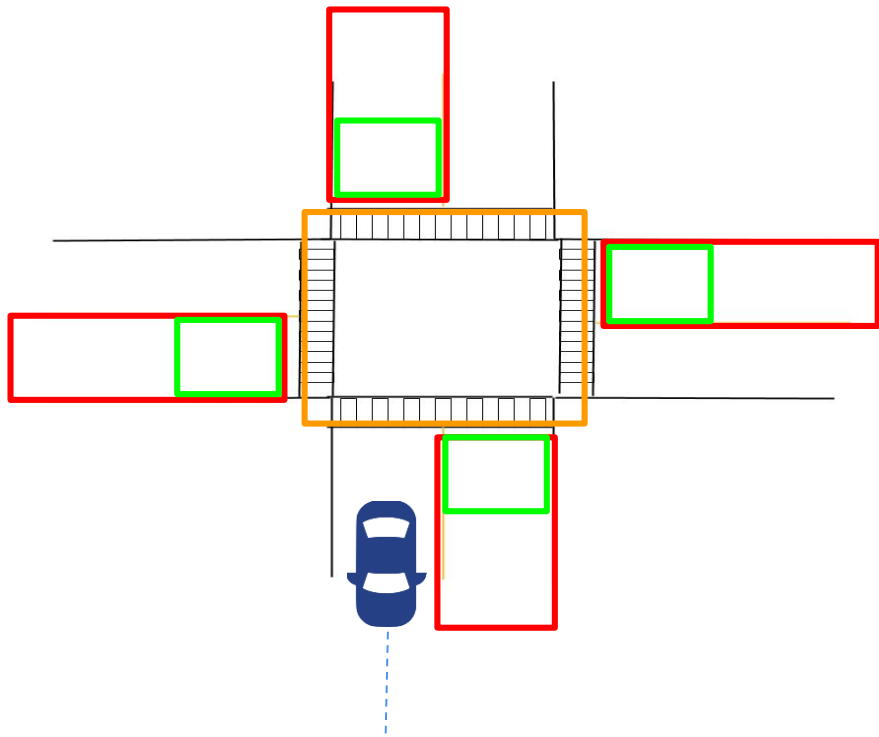
Multiple State Machine



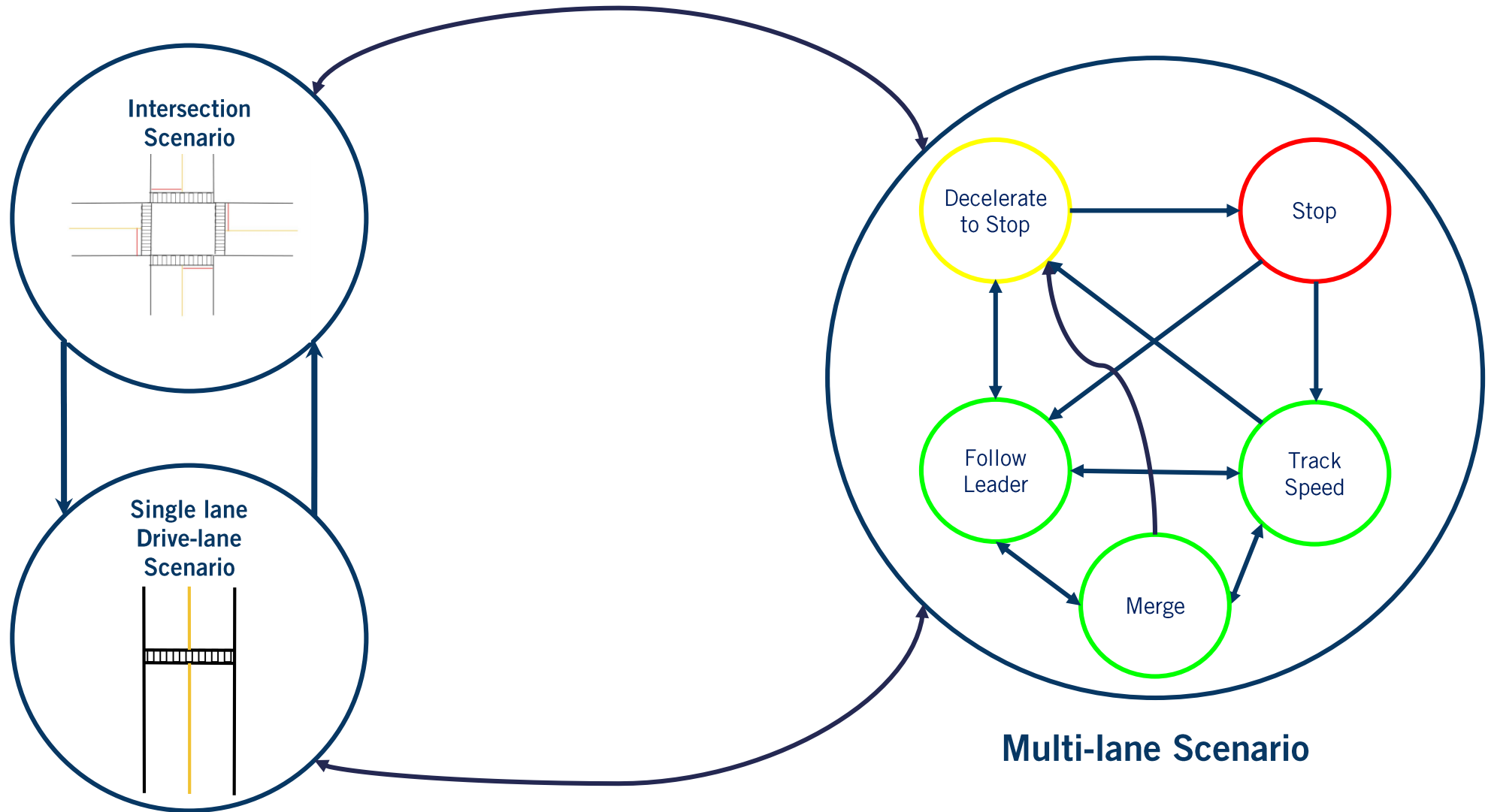
Hierarchical State Machine



Entry and Exit Transitions - Intersection

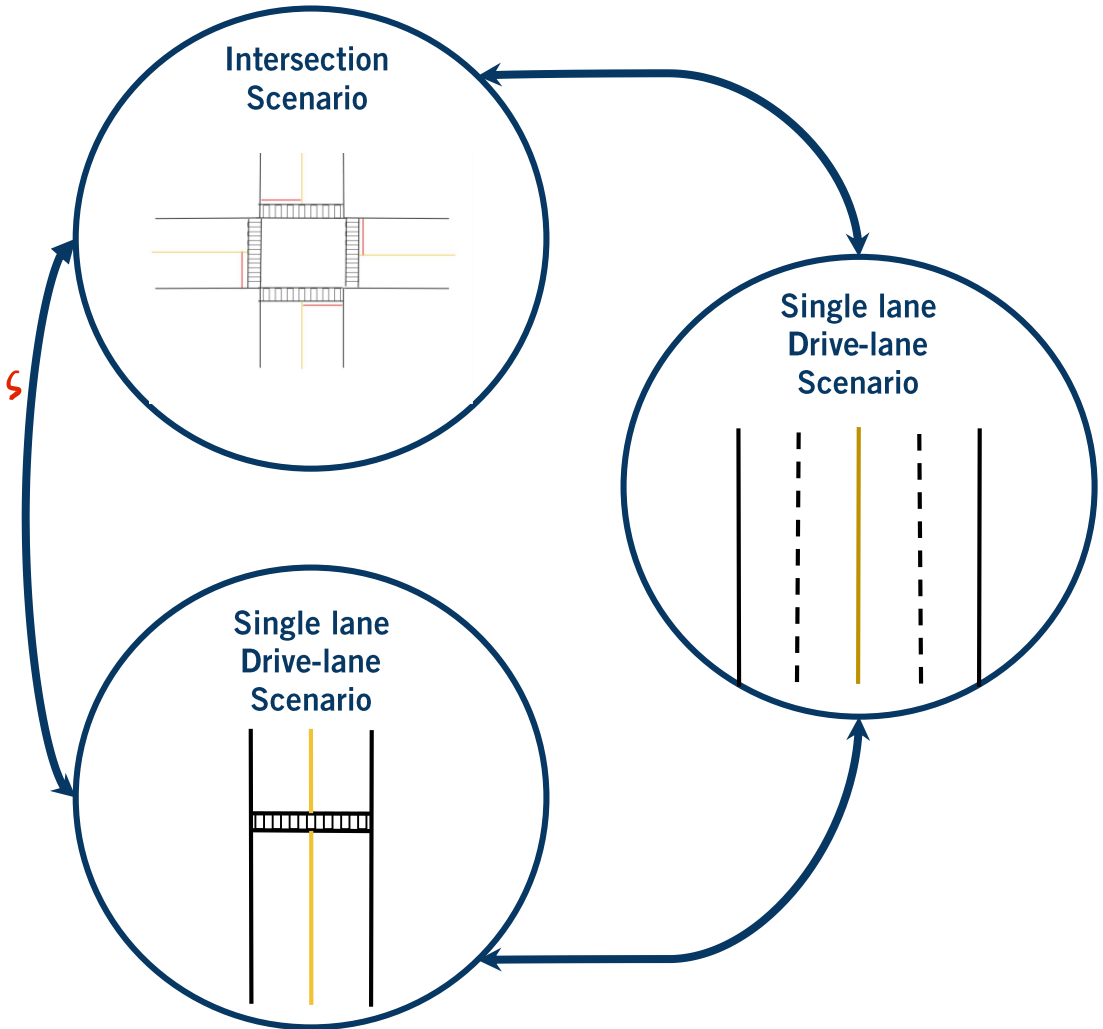


Hierarchical State Machine



Hierarchical State Machine - Advantages and Disadvantages

- Advantages:
 - Decrease in computational time
 - Simpler to create and maintain
 - Disadvantages:
 - Rule Explosion
 - Repetition of many rules in the low level state machines
- all scenarios have separated state machines*



Summary

- Developing a larger overarching state machine which includes multiple scenarios
- Develop a method to switch between driving scenarios
- **Next:** Advanced methods for behaviour planning