

# CITS7211 Modelling Complex Systems

## Project 1: Modelling a Traffic Intersection

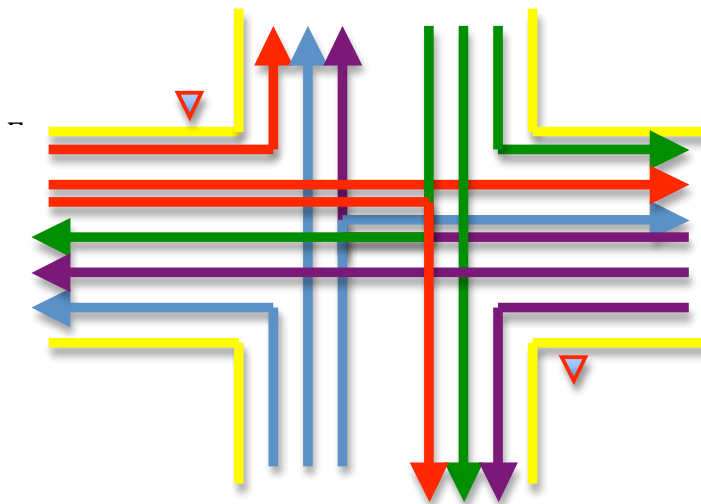
Due: 5pm Monday, 20<sup>th</sup> April

In this project you will be required to build a model of a traffic intersection, and investigate various traffic management solutions to improve the flow of traffic through that intersection. You will also be required to write a report detailing your model and solutions, the rationale behind them, the verification of your model, and related literature. You may work on the model, solutions and literature review in groups of two. However the report must be entirely your own work. If you work in a group, this must be clearly stated in your report. The report and the model must be submitted via csubmit by the due date and time. **This project is worth 20% of your final grade for the unit.**

### Intersection specifications:

The intersection you are modelling is the (fictitious) intersection between North Road and East Street. North Road is the busier road and has a speed limit of 70km/h, while East Street has a speed limit of 50km/h. Both streets have a single lane in each direction. Currently, there is just a give-way sign at the intersection, requiring that cars on East Street wait until the intersection is clear before they cross or turn onto North Road.

At any one time, the traffic flow through the intersection may be parameterized by 12 numbers representing the number of cars per unit time entering the intersection from direction, and leaving by another direction:



These parameters should be able to be varied to reflect different traffic conditions at different times of the day. You may also want to include parameters for acceleration, response time, driver aggressiveness etc.

**Traffic Management Solutions:** After you have modelled the basic intersection, implement one or more traffic management solutions for the intersection, and

determine its effectiveness under different conditions. The types of solutions you may consider could be:

1. Traffic lights (with timers or triggers or both)
2. A roundabout
3. Adding extra turning lanes to some streets, possibly with traffic lights.
4. Forbidding right turns.
5. Others...

**Deliverable A - The Model:** You should submit the model of the intersection, including your traffic management solutions to csubmit. If your model is not implemented in NetLogo, you should include a readme file describing how to run your model. You should include all source files and they should be clearly commented. The computational model is not worth any marks directly, but it will contribute strongly to the marking of the report.

**Deliverable B - The Report:** The report be between 10 and 20 pages and should include the following sections:

1. An overview of the scenario, and your modelled solution. **5%**
2. A review of traffic intersection modelling literature, describing relevant results. **20%**
3. A detailed description of your initial model, including your choice of parameters, agents etc, the assumptions you made, and the rationale for these choices. **20%**
4. A detailed description of your traffic management solution(s). How they were implemented, what additional assumptions you made. **20%**
5. A discussion of how you verified, or could verify the quality of your model, including what measurements could be taken, and what aggregate qualities of the model can you define. **15%**
6. A detailed report on the effectiveness of your traffic management solutions, and the results your model suggests. **15%**
7. A discussion of the limitations of your model, and any difficulties you experienced. **5%**

### Questions and Help:

1. Post any questions you have the discussion forum (<https://secure.csse.uwa.edu.au/run/help7211>)
2. Consultations: Tuesday 11-1, Rm 2.14
3. Email: [tim@csse.uwa.edu.au](mailto:tim@csse.uwa.edu.au)

**Good luck!**

Tim French, 2009