4 Intelligent Systems Lab Assignment — Multi-Agent Reinforcement Learning

In this lab you will implement at least two multi agent learning algorithms from the set of algorithms covered in class. You will observe and study their behaviour when playing each other in a small number of stateless games, namely the prisoners dilemma, the battle of the sexes and the matching pennies game. You should also do some experiments to observe the influence of the algorithms' parameters.

Source code is provided through the student portal that supports the experimentation and that visualises[1] both the action probabilities of both agents as well as the action value progression for both agents.

You can add your own learning algorithms by building implementations of the abstract agent class. There are two example agents provided to serve as starting points: one fixed policy agent and a Q-learning agents that uses a Boltzmann exploration strategy.

Try to see if your agents can learn to behave according to a Nash Equilibrium, i.e. converge to it. Observe how an agent's behaviour can change depending on what other type of agent it is playing against.

Handing in

Those of you who choose to earn their daily work points through this lab assignment: please upload your agents and a short report (in PDF format only) through the Student Portal by the deadline if you want to get credit for your work. The report should include a description of the algorithms you implemented as well as a discussion, probably with some visual aids, of your agents' behaviour (or disbehaviour). For those of you doing a presentation or using the other labs to collect points, save your agents and upload those to the student portal.

[1] Techniques used are pretty basic, feel free to update the visualisation and share your code with me to benefit students who come after you. :-)