

Math 36 — Weekly Homework

Assigned: 10/1

Due: 10/8

1. Describe a real-life scenario that can be modelled with game theory. What are the strategies, and what are the entries in the payoff matrix? Explain why you chose the payoff values that you did.

2. Give a game with exactly one pure and one mixed Nash Equilibrium or explain why no such game can exist.

3. Consider the following game:

		Player 2	
		<i>A</i>	<i>B</i>
Player 1	<i>A</i>	2	1
	<i>B</i>	$v$	3

For what values of  $v$  does this system have two pure and one mixed Nash Equilibrium?

4. Use evolutionary dynamics to model the types of commuters in a city where people can either drive their car (A) or ride their bike (B) to get to work.

Cars are naturally faster than bikes, but if there are too many people driving, then there will be traffic jams and bikes will be faster. The bike lanes can also get crowded if there are too many bikes.

- (a) Place the values 4, 3, 1, and 0 into the following payoff matrix:

	<i>A</i>	<i>B</i>
<i>A</i>	<input type="text"/>	<input type="text"/>
<i>B</i>	<input type="text"/>	<input type="text"/>

- (b) What fraction of cars to bikes will this system naturally converge to (assuming replicator dynamics)?