

1. Consider the following games:

	L	R
U	4,1	0,0
D	0,0	1,2

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U	0,1	1,0
D	4,0	0,2

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U	4,1	1,0
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- a) Write out the best response function for each player.
 b) Find all Nash equilibrium (pure and mixed).
2. Find a 2 player 2 action game where the set of mixed strategy Nash equilibrium strategies for player 1 is exactly equal to the interval $[0, 5/11]$ and the single point 1.
3. For problem #4 from homework #1 (about the assembly line). Determine all symmetric mixed strategy equilibria for each of the 5 parts. (Might need a calculator to find exact value of p in last part.)
4. Yogi Berra was a Hall of Fame baseball player for the New York Yankees. He was also famous for his quotes which are referred to as Yogi-isms. According to wikipedia, His "Yogi-isms" very often took the form of either an apparent tautology or a contradiction, but often with an underlying and powerful message that offered not just humor, but wisdom. One such quote was "Nobody goes there anymore. It's too crowded."

Suppose there is a population of n people. If an individual goes to the restaurant, they get a benefit of B . If they go they also incur a cost of c times the number of people at the restaurant that night. The total cost of going to the restaurant is ck where k is the number of people attending the restaurant that night.

- (a) Find all symmetric mixed and pure-strategy Nash equilibrium.
 (b) In the mixed Nash equilibrium from above, determine the expected number of people at the restaurant in a given night for a population of size n .
 (c) What happens to the probability that one individual goes to the restaurant as n gets large?
 (d) What happens to the expected number of people at the restaurant on a given night?
5. Consider an all-pay auction where everyone can either bid C or not bid. Everyone has the same value for the item, $V > C$. If more than one person bids, then the ties is broken by choosing one person randomly.
- a) Determine all pure-strategy Nash equilibrium (asymmetric and symmetric).
 b) Determine the mixed-strategy symmetric Nash equilibrium.

- c) In the mixed-strategy symmetric equilibrium what is the expected revenue as n gets large?
 d) What if this is a first price auction rather than an all-pay auction. Determine all Nash equilibria.