Game Theory Homework 6

1. Find all Nash equilibria and determine which of the symmetric equilibria are evolutionarily stable in the following games.

	A	B
A	$(4,4)$	$(2,5)$
B	$(5,2)$	$(3,3)$

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A	$(4,4)$	$(3,2)$
B	$(2,3)$	$(5,5)$

2. We intoduce a third type to the hawk and dove game called bourgeois (B) which will only fight if it got the resource first. If we assume that the birds are equally likely to find the prize first the payoff matrix is

	H	D	B
H	$(\frac{v}{2} - c, \frac{v}{2} - c)$	$(v, 0)$	$\left(\frac{3v}{4} - \frac{c}{2}, \frac{v}{4} - \frac{c}{2}\right)$
D	$(0, v)$	$(\frac{v}{2}, \frac{v}{2})$	$\left(\frac{v}{4}, \frac{3v}{4}\right)$
B	$\left(\frac{v}{4} - \frac{c}{2}, \frac{3v}{4} - \frac{c}{2}\right)$	$\left(\frac{3v}{4}, \frac{v}{4}\right)$	$(\frac{v}{2}, \frac{v}{2})$

Find the evolutionarily stable strategies when $c > \frac{v}{2}$.

3. Two wolves can each choose to hunt deer or rabbit. A wolf hunting rabbit will succeed and get payoff r. If a single wolf hunts the deer it will fail and have payoff 0, while if both wolves hunt the deer together they succeed and each gets payoff $s/2$. Write down the payoff matrix and when $s > 2r$ find the evolutionarily stable strategies.

4. Two players are each given an independent number uniform in $\{0, 1, 2\}$, which only they see. Player I may "pass," in which case no money changes hands, or he may choose to "play." At this point, Player II may choose to "pass," in which case he gives \$1 to player I, or he may choose to "play." If player II chooses to play then the player with the higher number wins \$2 from the player with the lower number. No money changes hands if both play and it is a tie. Find the Nash equilibria for the game.