1. Consider the following game:

		Player 2		
		Low	Medium	High
Player 1	Low	7,5	2,7	1,1
	Medium	2,0	0,2	5,0
	High	8,1	3,4	6,2

a Suppose that this game is repeated 37 times. Find a pure strategy Nash equilibrium to this repeated game.

b Is the Nash equilibrium you found for the finitely repeated game in part **a** unique? Explain why or why not.

Suppose now that the game is repeated *infinitely*.

c Propose a set of strategies such that the outcome repeated in the stage game is the $(7, 5)$ outcome when both players choose Low.

d Determine the minimum discount rate needed by EACH player to ensure that the set of strategies you have suggested in part **c** is a subgame perfect Nash equilibrium to the game.

2. The Hatfields and McCoys have put aside their differences and are attempting to collude in their production of oil (such is the power of money). If both Restrict their oil supply and only produce 1000 barrels per day, each family will earn a profit of \$4500. However, both families have an incentive to Cheat on this agreement and produce 2000 barrels per day. If both Cheat and produce 2000 barrels each family's profits will be \$3000. However, if only one firm Cheats and produces 2000 barrels, then the profits to the cheating firm will be \$6000, and the profits to the firm that Restricts will be \$2000.

a (Draw the strategic form (matrix) version of the one-shot game.

b (5 points) What is the pure strategy Nash equilibrium of the game?

The only PSNE to this game is both firms choose Cheat (or 2000 barrels).

c Suppose that this game is played 100 times. Find a subgame perfect Nash equilibrium to this game.

d Is the SPNE you found in part **c** unique? Explain.

e Now suppose that this game is repeatedly infinitely and that both families have a common discount factor δ, where $0 < \delta < 1$. Assume that both families will follow a strategy of Restricting unless it observes the other family Cheat. If one family observes the other Cheat, then they will both choose Cheat forever (this is a Nash reversion strategy). For what range of discount rates will this set of strategies be a subgame perfect Nash equilibrium?