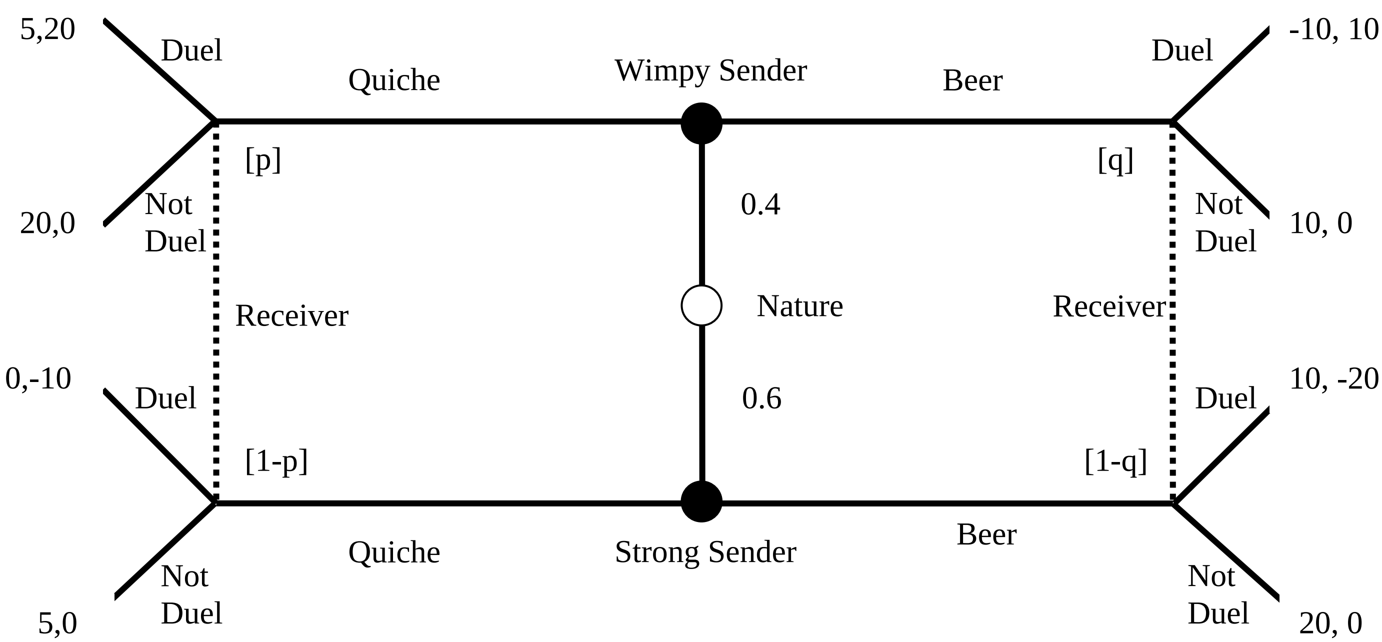
Spring 2013 – Chesnes
120 Minutes

Economics 644 – Final

Please answer ALL questions on this examination. Be sure to explain any non-standard notation that you use and JUSTIFY your answers. Each question is weighted equally. Good Luck!

1. ***Beer and Quiche Anyone?*** **Consider the following dynamic game of imperfect information:**



Nature initially chooses the sender's type (according to the probabilities shown in the tree) which becomes known to the sender but not the receiver. The sender chooses to have beer or quiche for breakfast and the receiver chooses whether or not to duel with the sender.

a. **State the 4 requirements necessary for a Perfect Bayesian Equilibrium.**

b. **Solve for a PBE which involves "pooling on beer."**

c. **Show that there does NOT exist a PBE which involves "separating on (Quiche, Beer)." I.e., the wimpy sender has quiche for breakfast and the strong sender has beer.**

2. ***Static and Repeated Games.*** **Consider the following game, G:**

Emily

John

	Left	Right
Up	(20 , 5)	(6 , 8)
Down	(X , X)	(5 , 12)

a. Assume X = 20. Solve for all Nash Equilibria of the game. As part of your answer, plot the best response correspondences in (p,q) space where p is the probability that John plays "Up" and q is the probability that Emily plays "Left." Show all your Nash Equilibria on the graph.

b. Assume X = 10. Write down Grim-Trigger strategies for each player to sustain (10, 10) as the average per-period payoff of $G(\infty,\delta)$, where $\delta=(\delta_1, \delta_2)$. I.e., players 1 and 2 may have different discount factors. Solve for the critical discount factors to sustain cooperation (i.e. players each receive 10 each period.)

c. Assume X = 10. Assume G is repeated infinitely and players have a common discount factor, $\delta=0.9$. Players play the following Limited-Punishment strategies:

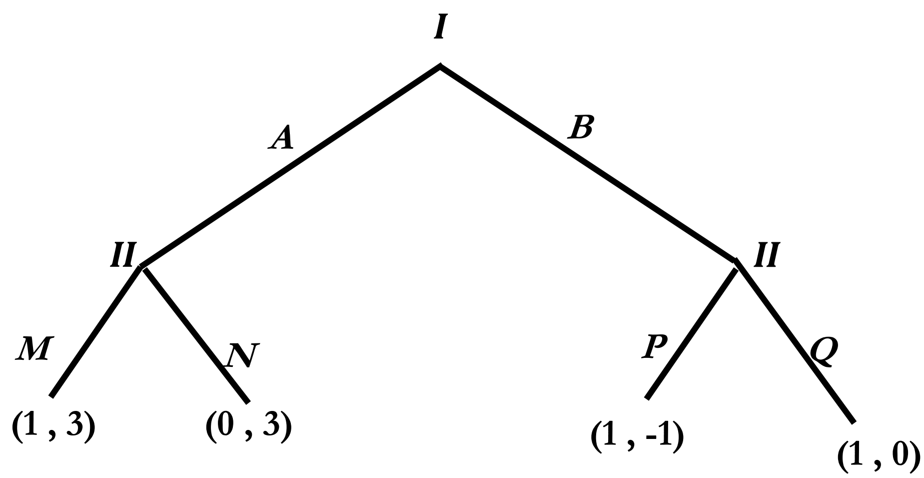
σ_1 = {Play "Down" in all periods unless a deviation from (Down, Left) has occurred or we are in a punishment phase. In the punishment phase, play "Up" for T periods and after T periods, play "Down" again unless another deviation occurs.}

σ_2 = {Play "Left" in all periods unless a deviation from (Down, Left) has occurred or we are in a punishment phase. In the punishment phase, play "Right" for T periods and after T periods, play "Left" again unless another deviation occurs.}

Solve for the minimum (integer) punishment period such that cooperation, i.e., playing (Down, Left) and receiving (10, 10) each period, is sustained.

d. Intuitively (you need not solve explicitly), if the common discount factor in part (c) was $\delta=0.95$, how would that affect the critical T you solved for in part (c)? Explain your reasoning.

3. ***Extensive Game.*** **Consider the following extensive game:**



Payoffs are denoted (J,K) where J is player I's payoff and K is player II's payoff.

a. **Write down all possible strategies of each player.**

b. **How many subgames does the above game have?**

c. **Solve for the Subgame Perfect Nash Equilibria.**