Strategic Behavior
Fall, 2022.
Problem Set 4
Due in class on Tuesday Nov 1.

From textbook: Do exercises 2.11

1. Consider a two stage entry game in a market where two firms can enter and produce identical goods at zero cost. To enter the market, a firm must incur a fixed set up cost $F > 0$. The market demand is given by

$$q = 12 - p$$

where p is the price and q is the total quantity sold. If a firm does not enter, it earns zero profit. If only one firm enters, the market is a monopoly. If both firms enter the market, they engage in Cournot quantity competition and choose outputs (q_1, q_2) simultaneously.

First, the two firms simultaneously decide whether or not to enter the market. Next, after observing the entry decisions, firms that enter choose their output.

For what range of values of F is there a subgame perfect equilibrium where:
(a) no firm enters
(b) both firms enter
(c) only one firm enters

2. Consider the following simultaneous move game:

$1\downarrow, 2\rightarrow$	L	R
T	$0, 0$	$5, -1$
B	$-1, 5$	$3, 3$

(a) What is the unique Nash equilibrium of this game?

(b) Suppose the game is repeatedly played an infinite number of times and the players maximize the present value of the stream of payoffs discounting future payoff with discount factor $\delta \in (0, 1)$. For what range of values of δ is there a subgame perfect equilibrium where both players earn payoff $(3, 3)$ in every period? Outline the strategies underlying this equilibrium clearly.

(c) How does your answer in (b) change if the game is repeated up to a finite number of times? Explain