MATH 1340, HOMEWORK #9

DUE THURSDAY, APRIL 20

Please *show your work* in the problems that require calculations. For the short answer questions, write in complete sentences. All assertions must be justified to get full credit.

0. (For participation credit.) Answer the response question on Piazza. This time, please submit your own response *or* respond to a classmate's answer.

Iterated Prisoner's Dilemma

1. [TP 4.27]

2. [TP 4.28]

Theory of Moves

3. Do a theory of moves analysis of the game chicken that is analogous to what was done for the Prisoner's Dilemma in TP §4.7 by doing the following steps.

(a) [TP 4.33] Show that (3,3) is a non-myopic equilibrium in the theory of moves version of Chicken.

(b) Complete the theory of moves analysis for the game Chicken. Are there any other non-myopic equilibria, other than (3,3)? (This may be somewhat long; at the beginning of your solution, put a box with the list of initial states, rows, and outcomes as follows and fill in the ??'s:

Initial State	First Mover	Outcome
(3,3)	R	??
(2,4)	R	??
(4,2)	R	??
(1,1)	R	??
(3,3)	C	??
(2,4)	C	??
(4,2)	C	??
(1,1)	C	??

and give your answer to whether there exist other non-myopic equilibria. Attach the scratch-work with your analysis to the end of the homework assignment.)

4. (Samson and Delilah) In *Biblical Games*, Brams (a founder of the theory of moves) models the story of Samson—a "ferocious warrior of inhuman strength"—and Delilah. Samson is in love with Delilah but the feeling is not reciprocated, as she was paid by the Philistines to find out the secret of his strength; Samson would rather not tell, but also does not want to be nagged. In the following 2×2 preference matrix, Row is Delilah and Column is Samson.

	Tell	Don't Tell
Don't Nag	(4,2)	(2,4)
Nag	(3,3)	(1,1)

(a) As a 2×2 ordinal game, what does this predict will happen? Why is this outcome unusual?

(b) Do a theory of moves analysis with initial state $(2, 4)$ for both Delilah and Samson going first. Adopt the convention that if the game ever returns to the initial state, then the game ends with the initial state as the outcome. (For example, if we start with $(2, 4)$ with Delilah going first, and we ever return to state $(2, 4)$ and it's Delilah's turn, then the game ends with outcome $(2, 4)$.) What does this predict will happen?

Zero-sum Games

5. [TP 10.11]

6. Prove that, for the last game of the previous exercise ([TP 10.11]), that the strategy for Row is the optimum strategy (look at TP §10.4 for an example of this kind of analysis).