SS 201b, Set 2
Due Tuesday, January 24th

Collaboration on homework is encouraged, but individually written solutions are required. Please name all collaborators and sources of information on each assignment. Any such named source may be used.

(1) *Cournot competition.* Find a symmetric equilibrium of the Cournot competition game, as described in the exercise in the lecture notes.

(2) *Elimination of dominated strategies.* Prove Theorem 2.9 from the lecture notes.

(3) *Elimination of weakly dominated strategies.* In the following game the additional strategy A was added to matching pennies.

	H	T	A
H	$1,0$	$0,1$	$2,0$
T	$0,1$	$1,0$	$1,0$
A	$1/2,0$	$0,1$	$2,2$

(a) Show that this game has a pure Nash equilibrium.

(b) What are the weakly dominated strategies?

(c) Iteratively remove the weakly dominated strategies. What is the resulting game? Does it have pure Nash equilibria?

(4) *The surprise quiz.* A teacher and a student play the following game. The teacher gives a surprise quiz on one of the five days of the work week. The student, who does not know the material, will fail if he does not review the material right before the quiz, but only has time to study on one day. Thus each player's set of the strategies is the set of five days of the work week. The student's utility is one if he and the teacher chose the same day, and zero otherwise. The teacher's utility is one minus the student's.

(a) Show that this game does not have a pure Nash equilibrium.

(b) Find a mixed equilibrium for this game.

(c) Show that if there are infinitely many days then there does not exist a mixed equilibrium.

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