14.126 Game Theory Problem Set #2

Due in Class #12

1. Apply the iterative elimination procedure below to the following game. We have two players, 1 and 2, who will play the Battle of the Sexes game (BoS) with payoff matrix

1\2	O	B
O	3,1	ϵ, ϵ
B	ϵ, ϵ	1,3

where ϵ is a small but positive number. Before playing this game, first, player 1 decides on whether or not to burn a utile in which case his payoffs will decrease 1 at each strategy profile of BoS. Then, knowing whether 1 has burned a utile, 2 decides on whether or not to burn a utile in which case her payoffs will decrease 1 at each strategy profile of BoS. Then, they play the Battle of the Sexes game — when it is common knowledge which players burned a utile.

The elimination procedure: Let S be the strategy space.

- Let $S^0 = S$.
- At any $t \in \{0, 1, \ldots\}$, given any player i, let Δ_i^t be the set of all probability assessments μ_i of i on S_{-i} such that, for any $s_{-i} \in S_{-i}$ and for any information set I of i, if $\mu_i(s_{-i}|I) > 0$, then $s_{-i} \in S_{-i}^t$ and there exists $s_i \in S_i$ such that information set I is reached under (s_i, s_{-i}). For each player i, and each pure strategy s_i, eliminate s_i iff there does not exists any $\mu_i \in \Delta_i^t$ such that s_i is sequentially rational with respect to μ_i. Let S^{t+1} be the set of all remaining strategy profiles.
- Iterate this until there is no strategy to eliminate.

The following exercises are from Osbourne and Rubinstein [OR] and Fudenberg and Tirole [FT]. If you need texts of the problems you will be accommodated.

Exercises:

146.1 (OR)

152.1 (OR)

5.10 (FT)