14.123 Microeconomic Theory III
Problem Set 3

1. Lecture Notes; Chapter 6.4, Exercise 8.

2. Alice and Bob seek each other. Simultaneously, Alice puts effort s_A and Bob puts effort s_B to search. The probability of meeting is $s_A s_B$; the value of the meeting is $v_A \geq 0$ for Alice and $v_B \geq 0$ for Bob, and the search costs s_A^3 to Alice and s_B^3 to Bob.

   (a) Compute the set of all rationalizable strategies.

   (b) How do the rationalizable search efforts change with v_A and v_B?

3. Consider a game with a finite set $N = \{1, \ldots, n\}$ of players and a finite set $S = S_1 \times \cdots \times S_n$ of strategy profiles. A general information structure is a list $(\Omega, I_1, \ldots, I_n, p_1, \ldots, p_n)$ where I_i is the information partition of i and $p_i \in \Delta(\Omega)$ is the prior belief of i for every $i \in N$. For every rationalizable strategy $s_i^* \in S_i^\infty$ of every player i, show that there exist a general information structure $(\Omega, I_1, \ldots, I_n, p_1, \ldots, p_n)$ and an adapted strategy profile $(\mathbf{s}_1, \ldots, \mathbf{s}_n)$ such that

   - $\mathbf{s}_i(\omega^*) = s_i^*$ for some $\omega^* \in \Omega$ and
   - $\mathbf{s}_j(\omega) \in \arg\max_{s_j \in S_j} E_{p_j}[u_j(s_j, \mathbf{s}_{-j}) | I_j(\omega)]$ for every $\omega \in \Omega$ and $j \in N$.

   [Hint: For every $i \in N$ and every $s_i \in S_i^\infty$, s_i is best reply a belief $\mu_i^{s_i}$ on S_{-i}^∞. Take $\Omega = S^\infty$.]

4. Characteruze the set of all correlated equilibrium distributions for the following game:

	L	R
U	3, 1	0, 0
D	0, 0	1, 3

14.123 Microeconomic Theory III

Spring 2015