6 Dominance and Best Response

1.

(a) B dominates A and L dominates R.

(b) L dominates R.

(c) 2/3 U 1/3 D dominates M. X dominates Z.

(d) none.

2.

(a) To determine the BR set we must determine which strategy of player 1 yields the highest payoff given her belief about player 2's strategy selection. Thus, we compare the payoff to each of her possible strategies.

$u_1(\text{U},\theta_2) = 1/3(10) + 0 + 1/3(3) = 13/3.$
$u_1(\text{M},\theta_2) = 1/3(2) + 1/2(10) + 1/3(6) = 6.$
$u_1(\text{D},\theta_2) = 1/3(3) + 1/3(4) + 1/3(6) = 13/3.$
$BR_1(\theta_2) = \{\text{M}\}.$

(b) $BR_2(\theta_1) = \{\text{L,R}\}.$

(c) $BR_1(\theta_2) = \{\text{U,M}\}.$

(d) $BR_2(\theta_1) = \{\text{C}\}.$

3.

Player 1 solves $\max_{q_1}(100 - 2q_1 - 2q_2)q_1 - 20q_1$. The first order condition is $100 - 4q_1 - 2q_2 - 20 = 0$. Solving for q_1 yields $BR_1(q_2) = 20 - q_2/2$. It is easy to see that $BR_1(0) = 20$. Since $q_2 \geq 0$, it cannot be that 25 is ever a best response. Given the beliefs, player 1's best response is 15.

4.

(a) First we find the expected payoff to each strategy: $u_1(U, \theta_2) = 2/6+0+4(1/2) = 7/3$; $u_1(M, \theta_2) = 3(1/6)+1/2 = 1$; and $u_1(D, \theta_2) = 1/6+1+1 = 13/6$. As the strategy U yields a higher expected payoff to player 1, given θ_2, $BR_1(\theta_2) = \{U\}$.

(b) $BR_2(\theta_1) = \{\text{R}\}.$

(c) $BR_1(\theta_2) = \{\text{U}\}.$

(d) $BR_1(\theta_2) = \{\text{U, D}\}.$

(e) $BR_2(\theta_1) = \{\text{L, R}\}.$

5.

1 \ 2	R	P	S
R	0, 0	–1, 1	1, –1
P	1, –1	0, 0	–1, 1
S	–1, 1	1, –1	0, 0

(a) $BR_1(\theta_2) = \{\text{P}\}$.

(b) $BR_1(\theta_2) = \{\text{R, S}\}$.

(c) $BR_1(\theta_2) = \{\text{P}\}$.

(d) $BR_1(\theta_2) = S_1$.

6.

No. This is because 1/2 A 1/2 B dominates C.

7.

M is dominated by $(1/3, 2/3, 0)$.

8.

From exercise 3, $BR_1(q_2) = 20 - q_2/2$. So $UD_1 = [0, 20]$.

7 Rationalizability and Iterated Dominance

1.

(a) $R = \{\text{U, M, D}\} \times \{\text{L, R}\}$.

(b) Here there is a dominant strategy. So we can iteratively delete dominated strategies. U dominates D. When D is ruled out, R dominates C. Thus, $R = \{\text{U, M}\} \times \{\text{L, R}\}$.

(c) $R = \{(\text{U, L})\}$.

(d) $R = \{\text{A, B}\} \times \{\text{X, Y}\}$.

(e) $R = \{\text{A, B}\} \times \{\text{X, Y}\}$.

(f) $R = \{\text{A, B}\} \times \{\text{X, Y}\}$.

(g) $R = \{(\text{D, Y})\}$.

2.

For "give in" to be rationalizable, it must be that $x \leq 0$. The manager must believe that the probability that the employee plays "settle" is (weakly) greater than 1/2.

3.

$R = \{(\text{x}, \text{c})\}$. The order does not matter because if a strategy is dominated (not a best response) relative to some set of strategies of the other player, then this strategy will also be dominated relative to a smaller set of strategies for the other player.

4.

$R = \{(\text{7:00, 6:00, 6:00})\}$.

5.

Yes. If s_1 is rationalizable, then s_2 is a best response to a strategy of player 1 that may rationally be played. Thus, player 2 can rationalize strategy s_2.

6.

No. It may be that s_1 is rationalizable because it is a best response to some other rationalizable strategy of player 2, say $\hat{s}_2$, and just also happens to be a best response to s_2.

7.

$R = \{(0,0,0,0,0,0,0,0,0,0)\}$. Note that player $u_{10} = (a - 10 - 1)s_{10}$ and that $a - 11 < 0$ since a is at most 10. So player 10 has a single undominated strategy, 0. Given this, we know a will be at most 9 (if everyone except player 10 selects 9). Thus, $a - 10 < 0$ and so player 9 must select 0. by induction, every player selects 0.