Problem 2 - Update

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Here is the updated solution with the calculations shown.

a) $BR_1(\theta_2), \theta_2 = (1/6, 1/3, 1/2) = \{U\}$

$u(U, \theta_2) = \frac{1}{6} \cdot 2 + \frac{1}{3} \cdot 0 + \frac{1}{2} \cdot 4 = 2.\bar{3}$
$u(M, \theta_2) = \frac{1}{6} \cdot 3 + \frac{1}{3} \cdot 0 + \frac{1}{2} \cdot 1 = 1$
$u(D, \theta_2) = \frac{1}{6} \cdot 1 + \frac{1}{3} \cdot 3 + \frac{1}{2} \cdot 2 = 2.1\bar{6}$
$u(U, \theta_2)$ is largest so U is best response

b) $BR_2(\theta_1), \theta_1 = (1/6, 1/3, 1/2) = \{R\}$

$u(\theta_1, L) = \frac{1}{6} \cdot 6 + \frac{1}{3} \cdot 6 + \frac{1}{2} \cdot 4 = 2.5$
$u(\theta_1, C) = \frac{1}{6} \cdot 3 + \frac{1}{3} \cdot 0 + \frac{1}{2} \cdot 5 = 3.1\bar{6}$
$u(\theta_1, R) = \frac{1}{6} \cdot 1 + \frac{1}{3} \cdot 5 + \frac{1}{2} \cdot 3 = 3.8\bar{3}$
$u(\theta_1, R)$ is largest so R is best response

c) $BR_1(\theta_2), \theta_2 = (1/4, 1/8, 5/8) = \{U\}$

$u(U, \theta_2) = \frac{1}{4} \cdot 2 + \frac{1}{8} \cdot 0 + \frac{5}{8} \cdot 4 = 10.5$
$u(M, \theta_2) = \frac{1}{4} \cdot 3 + \frac{1}{8} \cdot 0 + \frac{5}{8} \cdot 1 = 3.25$
$u(D, \theta_2) = \frac{1}{4} \cdot 1 + \frac{1}{8} \cdot 3 + \frac{5}{8} \cdot 2 = 5.625$
$u(U, \theta_2)$ is largest so U is best response

d) $BR_1(\theta_2), \theta_2 = (1/3, 1/3, 1/3) = \{U, D\}$

$u(U, \theta_2) = \frac{1}{3} \cdot 2 + \frac{1}{3} \cdot 0 + \frac{1}{3} \cdot 4 = 2$
$u(M, \theta_2) = \frac{1}{3} \cdot 3 + \frac{1}{3} \cdot 0 + \frac{1}{3} \cdot 1 = 1.\bar{3}$
$u(D, \theta_2) = \frac{1}{3} \cdot 1 + \frac{1}{3} \cdot 3 + \frac{1}{3} \cdot 2 = 2$
$u(U, \theta_2)$ & $u(D, \theta_2)$ are largest so U, D is best response

e) $BR_2(\theta_1), \theta_1 = (1/2, 1/2, 0) = \{L, R\}$

$u(\theta_1, L) = \frac{1}{2} \cdot 6 + \frac{1}{2} \cdot 6 + 0 \cdot 4 = 4.5$
$u(\theta_1, C) = \frac{1}{2} \cdot 3 + \frac{1}{2} \cdot 0 + 0 \cdot 5 = 2$
$u(\theta_1, R) = \frac{1}{2} \cdot 1 + \frac{1}{2} \cdot 5 + 0 \cdot 3 = 4.5$
$u(\theta_1, L)$ & $u(\theta_1, R)$ are largest so L, R is best response