**HOMEWORK # 6 ANSWERS**

(a) Let \( p \) be the probability of \( T \) and \( q \) the probability of \( L \). Then \( p \) and \( q \) are given by the solution to \( q = 2(1-q) \) and \( 4(1-p) = 2p + 1 - p \), which is \( q = \frac{2}{3} \) and \( p = \frac{3}{5} \). Thus the mixed-strategy Nash equilibrium is \( \left( \frac{3}{5}, \frac{2}{5} \right) \).

(b) Let \( \begin{pmatrix} a \\ b \\ c \\ d \\ p \\ q \\ r \\ 1-p-q-r \end{pmatrix} \) be the common prior. Then it must satisfy the following equations:

\[
\frac{p}{p+1-p-q-r} = \frac{1}{3}, \quad \frac{q}{q+r} = \frac{1}{2}, \quad \frac{p}{p+q} = \frac{1}{2} \quad \text{and} \quad \frac{r}{r+1-p-q-r} = \frac{1}{3}.
\]

The solution is \( \begin{pmatrix} a \\ b \\ c \\ d \\ \frac{1}{5} \\ \frac{1}{5} \\ \frac{1}{5} \\ \frac{2}{5} \end{pmatrix} \).

(c) The game is as follows:

(d) The question is about finding the payoffs of the players associated with the pure-strategy profile \( (TT,RR) \). The expected payoff of Player 1 is \( 3p + 0q + 0r + 3(1-p-q-r) \) [using the calculated common prior this is equal to \( 3 \cdot \frac{1}{5} + 3 \cdot \frac{2}{5} = \frac{9}{5} = 1.8 \)] and the expected payoff of Player 2 is \( 2p + 2q + 2r + 2(1-p-q-r) = 2 \).