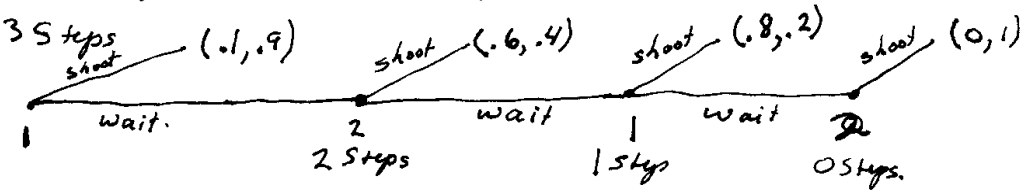
Math 304 Final 6/6/2000 C. Robinson

(1) Row 1 dominates row 3 for matrix A.
Column 3 dominates column 1 for B.
Leaving $\begin{pmatrix} 4 & 1 \\ 3 & 2 \end{pmatrix}$ & $\begin{pmatrix} 2 & 3 \\ 1 & 2 \end{pmatrix}$
Col2 Col3
Column 3 dominates column 2 leaving $\binom{1}{2}$ & $\binom{3}{2}$
Row 2 dominates row 1.
Thus the only Nash equilibrium is row 2 column 3 with payoff (2, 2).

(2) Let $(p, 1-p)$ be strategy profile for player 1 and $(q, 1-q)$ for player 2 (columns).
Then $u_1 = 1pq + 4p(1-q) + 2(1-p)q + 0(1-p)(1-q)$
$\frac{\partial u_1}{\partial p} = q + 4(1-q) - 2q = 4 - 5q$.
Set $=0$ and get $q^* = 4/5$
$u_2 = 2pq + 1q(1-p) + 3(1-p)(1-q) + 0p(1-q)$
$\frac{\partial u_2}{\partial q} = 2p + (1-p) - 3(1-p) = -2 + 4p$
Set $=0$ and get $p^* = \frac{1}{2}$.
Strategy $p^* = \frac{1}{2}$, $1-p^* = \frac{1}{2}$ & $q^* = \frac{4}{5}$, $1-q^* = \frac{1}{5}$.

(3) If the player 1 shoots the payoffs are $(p_1(d), 1-p_1(d))$.
If player 2 shoots the payoffs are $(1-p_2(d), p_2(d))$



0 Steps: P_2 chooses to shoot (if it gets there) because max payoff
1 Step: P_1 chooses to shoot because payoff of .8 > payoff if wait 0
2 Steps: P_2 chooses to shoot because payoff of .4 > payoff if wait of .2
3 Steps: P_1 chooses to wait because payoff of .1 < payoff if wait of .6