Economic 211B, David K. Levine
Answers to Problems on Game Theory Fundamentals

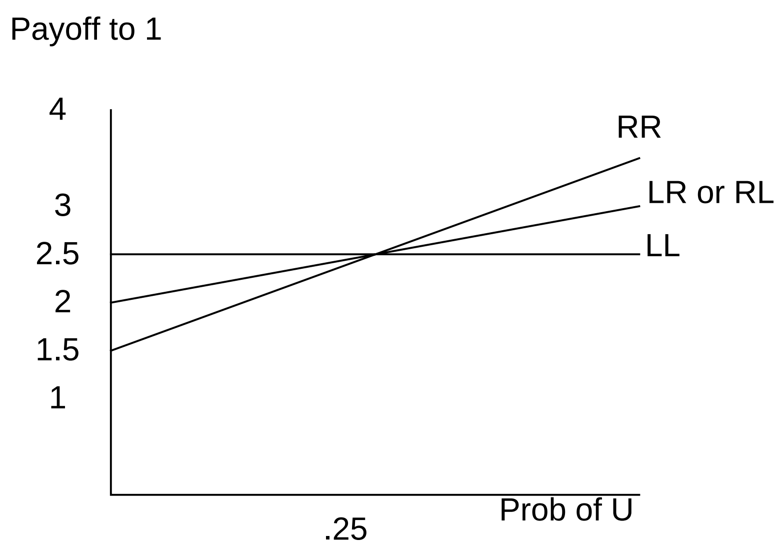
Last modified: March 11, 1998

1. When $x = 18$ the mixed strategy equilibrium (indifference between the two strategies) is at 50-50. So if $x > 18$ the bottom (Pareto efficient) equilibrium is risk dominant; if $x < 18$ the top (inefficient) equilibrium is risk dominant.

2. Nash = Subgame perfect since there are no subgames; more strongly any beliefs at the information set "2" if that information set is not reached, so Nash = Sequential when x=2,3; see below for the case x=1.

The normal form is

	u	d
LL	2.5, 2.5	2.5, 2.5
LR	4, 2.5	2, 1.5+.5x
RL	4,1.5	2,1
RR	5.5, 1.5	1.5, .5x



NASH

LL and Prob(U) ≤.25 is Nash
RR,U is Nash and strict if x=1,2
RR and Prob(U) ≥.25 and x=3 is Nash
Prob(U) =.25 means 1 is indifferent between all strategies
for 2 the difference between U and D is

	0
LR	1-.5x
RL	.5

RR	1.5-.5x

x=1 then only LL is played
x=2 then only LL and LR are played
x=3 any weight on LL and RR and equal chances of LR and RL

Sequential
x=2,3 same as Nash
x=1 LL,d fails sequential since D is dominated by U

Iterated Weak Dominance
x=1,2 (RR,u)

Trembling Hand
x=1,2 any trembling by player 1 leads to U for player 2, forcing RR for player 1
x=3 any tremble by 1 that puts enough weight on LR leaves 2 willing to play D

3. (a) for all σ_i, σ_{-i} we have
$\max_{\sigma'_i} u^i(\sigma'_i, \sigma_{-i}) \geq u^i(\sigma_i, \sigma_{-i}) \geq \min_{\sigma'_{-i}} u^i(\sigma_i, \sigma'_{-i})$

(b) consider an aggregate player who controls all of $-i$; the strategy space of such a player are all correlated strategies for these players

(c) a THREE PLAYER game in which minimax>maximin: any example in which players 2 and 3 can do more damage to player 1 by correlating their play than by playing independently; 1 chooses the matrix, 2 chooses row, 3 chooses column

player 1's payoffs $\begin{bmatrix} 1 & 10 \\ 10 & 0 \end{bmatrix} \begin{bmatrix} 0 & 10 \\ 10 & 1 \end{bmatrix}$