

12 - 2 - 05

①

Each player should ~~not~~ choose a mixed (random strategy) so that the other player doesn't have an advantage by any particular move.

		Paris		
		A	B	Min
Nicole	C x times	-2 $-2x$	-3 $-3x$	-3 Maximin    -3
	D 100-x	-4 $-4(100-x)$	3 $3(100-x)$	-4 Not the same ∴ No Saddle Point. Minimax = -2
max		-2	3	

What should Nicole do? Play C x times & play D 100-x times

Paris' Payoff from A  $2x + 4(100-x) = 400 - 2x$

----- B  $3x - 3(100-x) = 6x - 300$

No Advantage for Paris

$$-2x + 400 = 6x - 300$$

Solve for x

$$700 = 8x, x = 700/8 = 87.5$$

Out of 100 times Nicole (2)

Should Play C 87.5 times

& D 12.5 times

P

Let  $p = \frac{x}{100}$   
 percent of time  
 N plays C

$$\frac{100-x}{100} = \frac{100}{100} - \frac{x}{100} = 1-p$$

		A	B
N	C	$-2p$	$-3p$
	D	$-4(1-p)$	$3(1-p)$

P's  
Average  
Payoff

$$-2p - 4 + 4p = -3p + 3 - 3p$$

$$\begin{array}{r} -4 + 2p = -6p + 3 \\ +4 + 6p \quad +6p + 4 \end{array}$$

$$8p = 7, \quad p = \frac{7}{8} = 87.5\%$$

Nicole's payoffs

N

		A	B	
N	C	$-2p$	$-3(1-p)$	$= -2p - 3 + 3p$
	D	$-4p$	$3(1-p)$	$= -4p + 3 - 3p$

P wants to make N's payoffs equal:

$$\begin{array}{ccc} C & & D \\ P - 3 & = & -7p + 3 \\ +7p + 3 & & +7p + 3 \end{array}$$

$$8p = 6, \quad p = 75\% = \frac{6}{8}$$

So P plays A 75% of the time

& . . . B 25% . . . . .

Check that N's payoffs are the

same:

$$C: \quad P - 3 \quad \text{where } p = .75$$

$$P - 3 = .75 - 3 = -2.25$$

$$D: \quad -7p + 3 = -7(.75) + 3 = -5.25 + 3 = -2.25$$

(3)