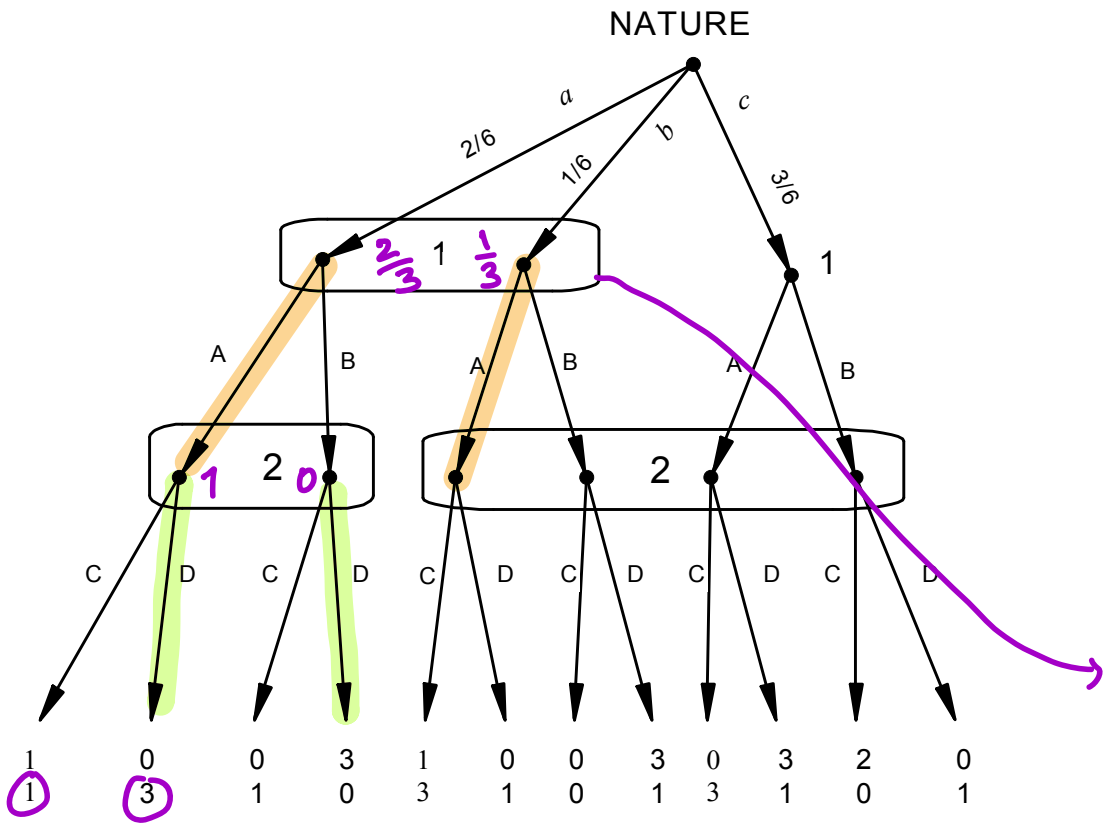


This game does not have pure-strategy Nash equilibria

- Suppose player 1's pure strategy involves playing A at her left information set

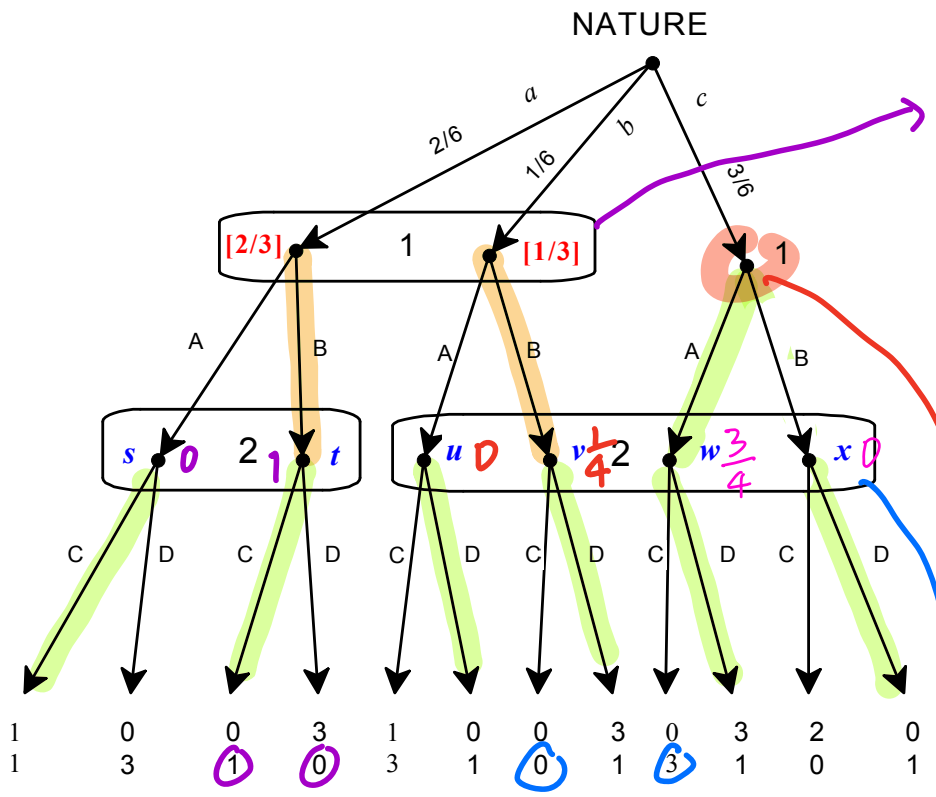
with

$$A \to \frac{2}{3}\,0 + \frac{1}{3}\begin{cases} 1 \text{ if } C \\ 0 \text{ if } D \end{cases}$$ } at right info set

at most $\frac{1}{3}$

$$B \to \frac{2}{3}\,3 + \frac{1}{3}\begin{cases} 0 \\ 3 \end{cases} \geq 2$$

$\Rightarrow$ A cannot be optimal for Pl. 1 at left info set



with A → $\frac{2}{3}1 + \frac{1}{3}$ < 1 if C, 0 if D

with B → $\frac{2}{3}0 + \frac{1}{3}$ < 0 if C, 3 if D

B optimal iff player 2 plays D at right info set

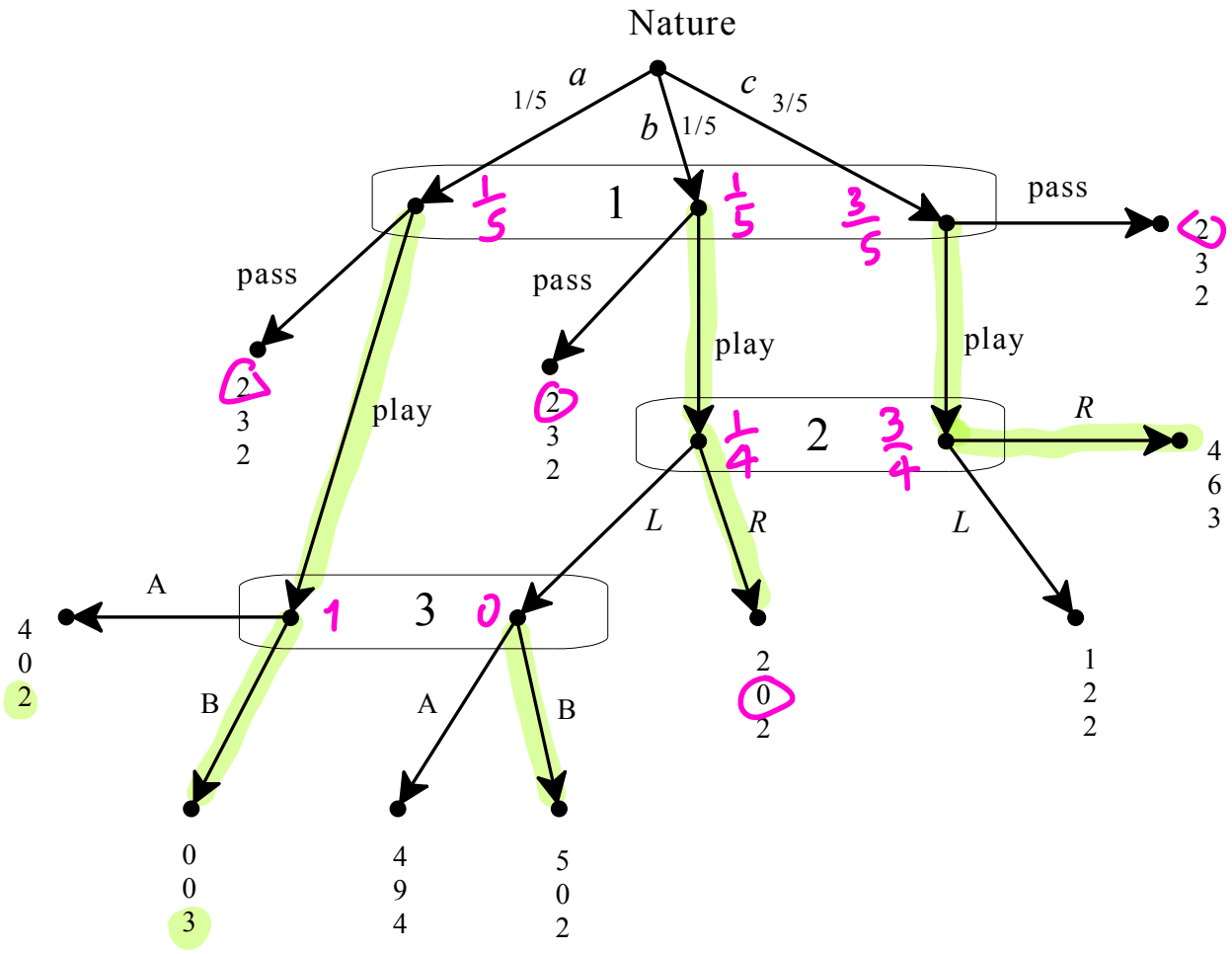
A → 3 ✓ B → 0

Suppose that Player 1's pure strategy involves playing *A* at his left information set.

C → $\frac{1}{4}0 + \frac{3}{4}3 = \frac{9}{4}$

D → $\frac{1}{4}1 + \frac{3}{4}1 = 1$ ✓

D not optimal



$R \to \frac{1}{4}0 + \frac{3}{4}6 = \frac{18}{4}$ ✓

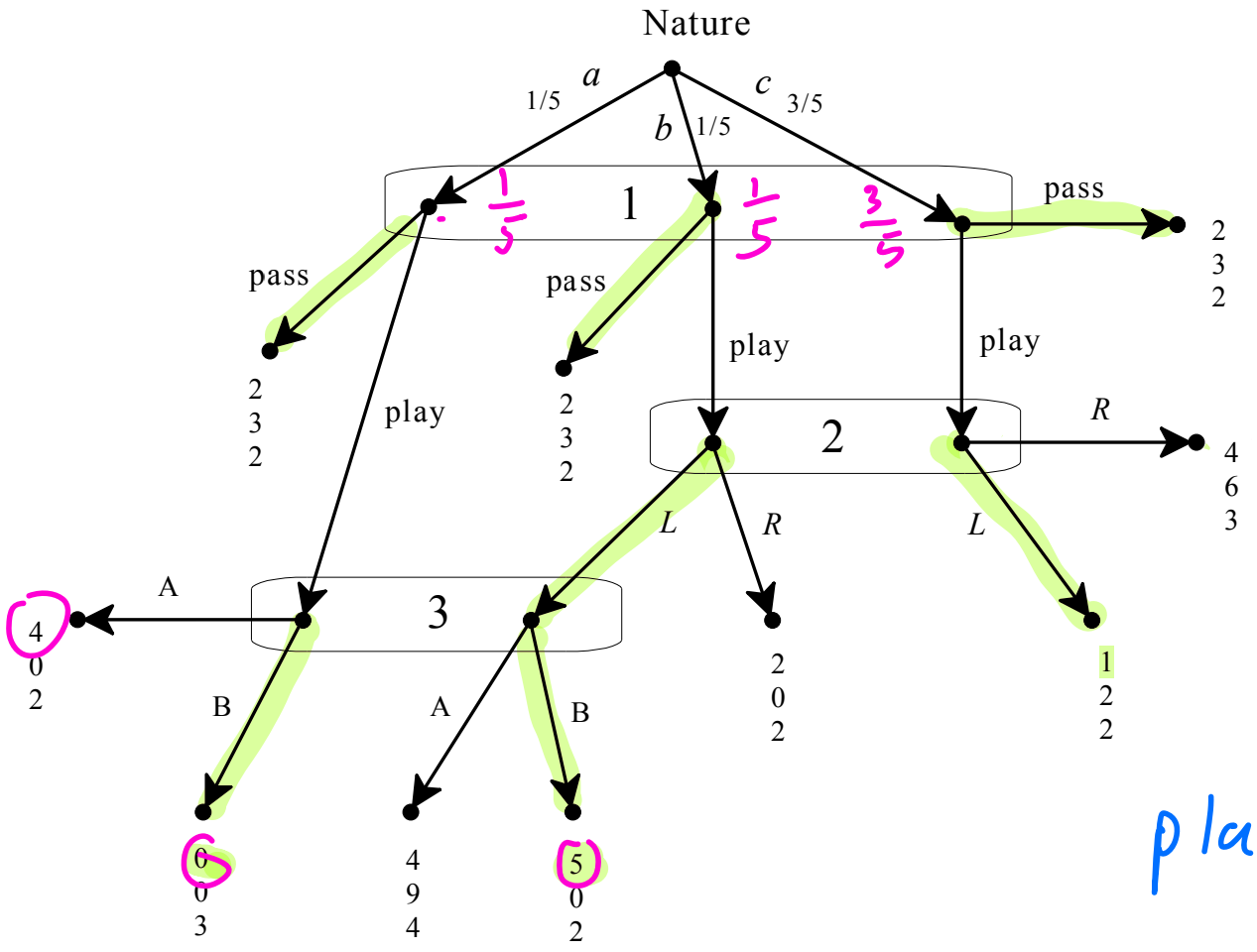
$L \to \frac{3}{4}2 + \frac{1}{4}\begin{cases} 4 \text{ if A} \\ 0 \text{ if B} \end{cases}$

$\frac{6}{4}$ or $\frac{15}{4}$

Now confirm that for Player 1 "play" is optimal

pass $\to 2$

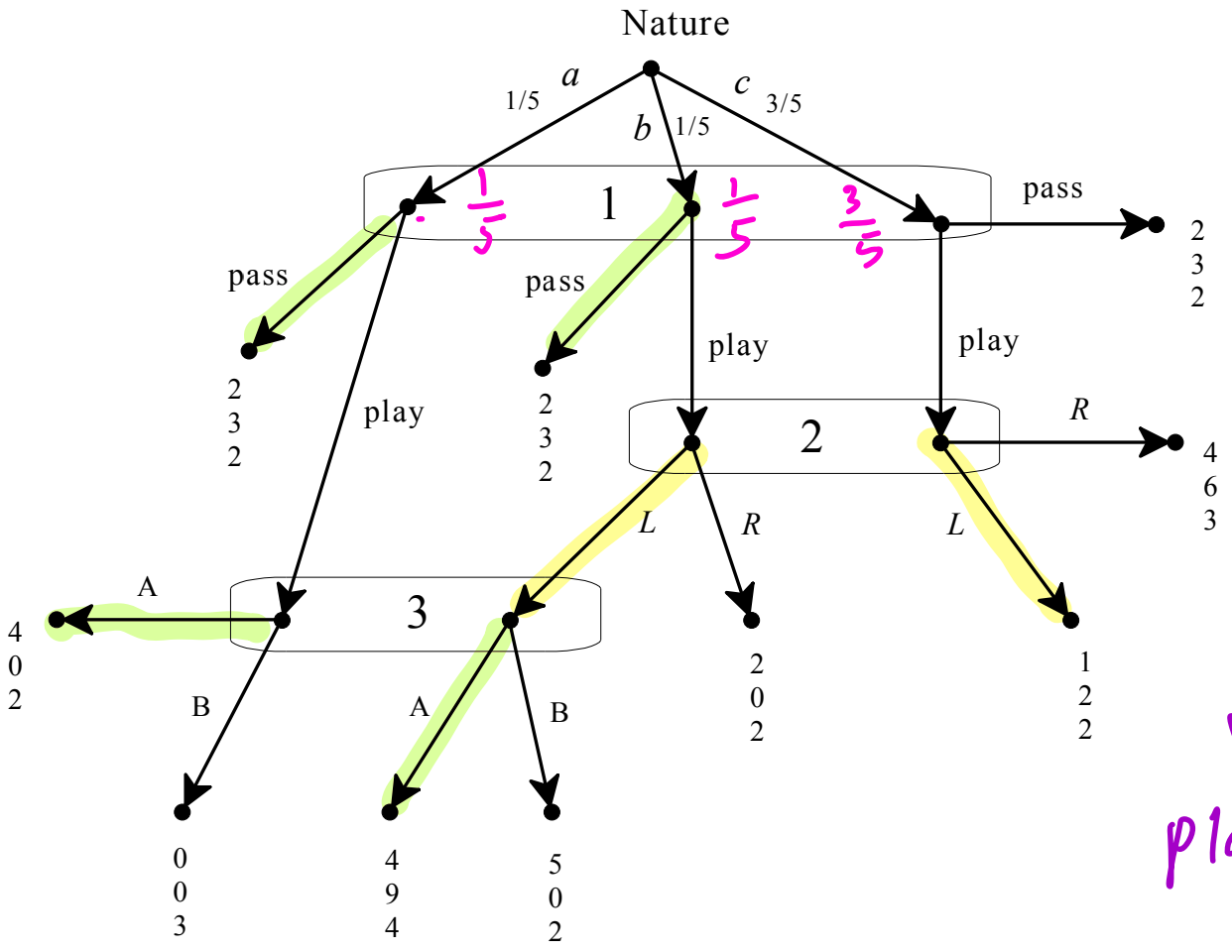
play $\to \frac{1}{5}0 + \frac{1}{5}2 + \frac{3}{5}4 = \frac{14}{5}$ > 2 ✓



pass → 2

play → $\frac{1}{5}0 + \frac{1}{5}2 + \frac{3}{5}4 = \frac{14}{5}$

play: $\frac{1}{5}0 + \frac{1}{5}5 + \frac{3}{5}2 = \frac{11}{5} > 2$



pass → 2

with L

play : $\frac{1}{5}4 + \frac{1}{5}4 + \frac{3}{5}1$

$= \frac{11}{5} > 2$

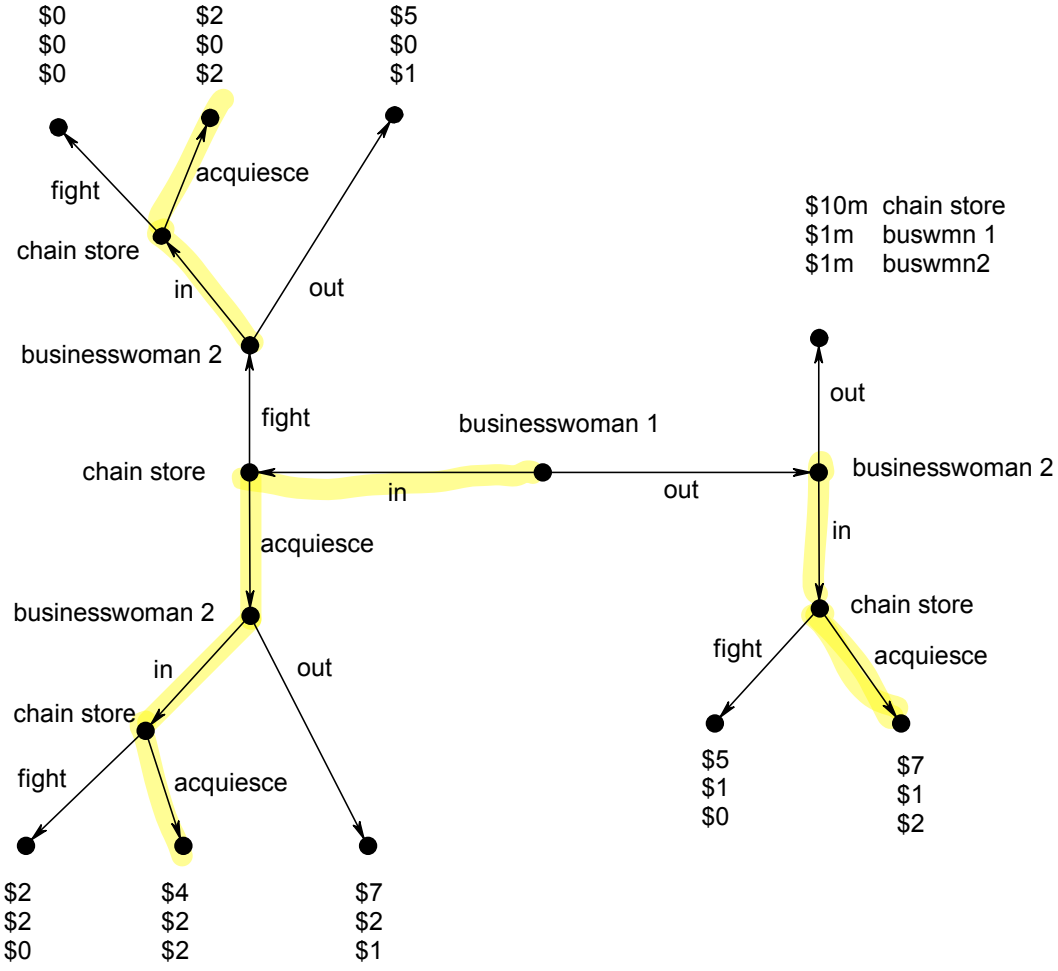
with R : play $\frac{1}{5}4 + \frac{1}{5}2 + \frac{3}{5}4 = \frac{18}{5} > 2$

EXAMPLE 1: Selten's Chain-Store Game

The one-shot game is as follows:

		Chain store: fight	Chain store: accommodate
Potential entrant	In	0 , 0	2 , 2
	Out	1 , 5	1 , 5

What is the backward induction solution to this game? The case m = 2:



Add incomplete information

If the incumbent is of type b (rational): 0

		entrant: in	entrant: out
incumbent	aggressive	0 , 0	5 , 1
	cooperative	1.5 , 1.5	5 , 1

If the incumbent is of type a (fanatic): 2

		entrant: in	entrant: out
incumbent	aggressive	2 , 0	5 , 1
	cooperative	1.5 , 1.5	5 , 1

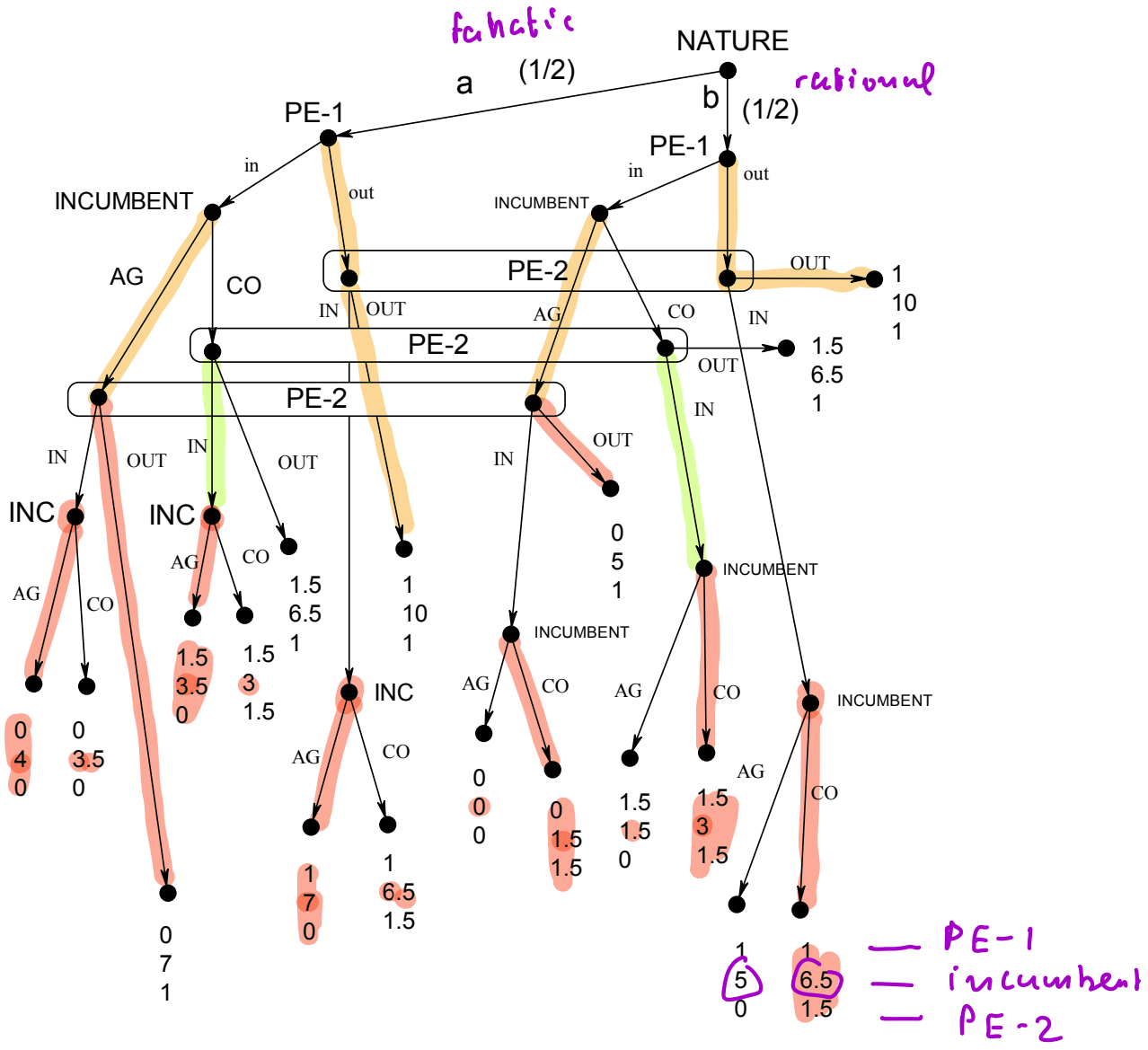
Incumbent: a b

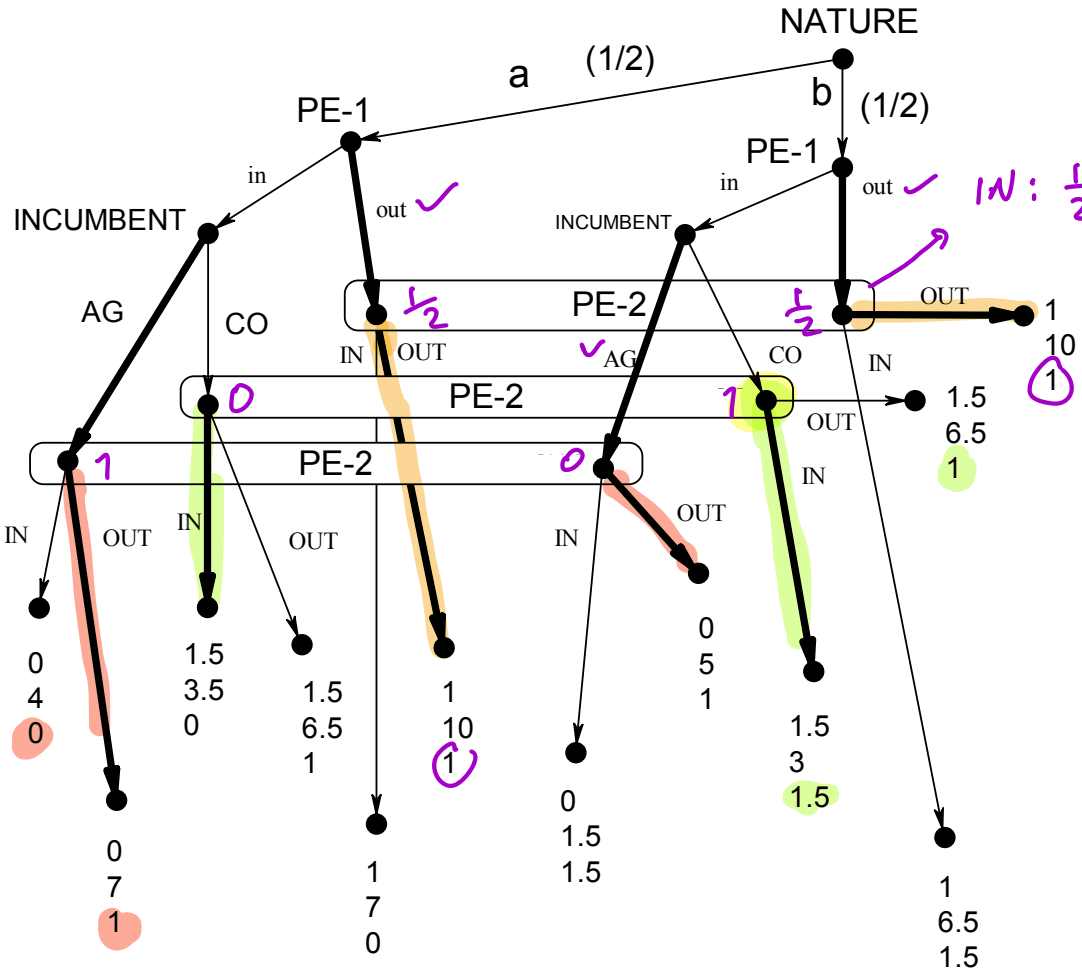
PE-1: a b

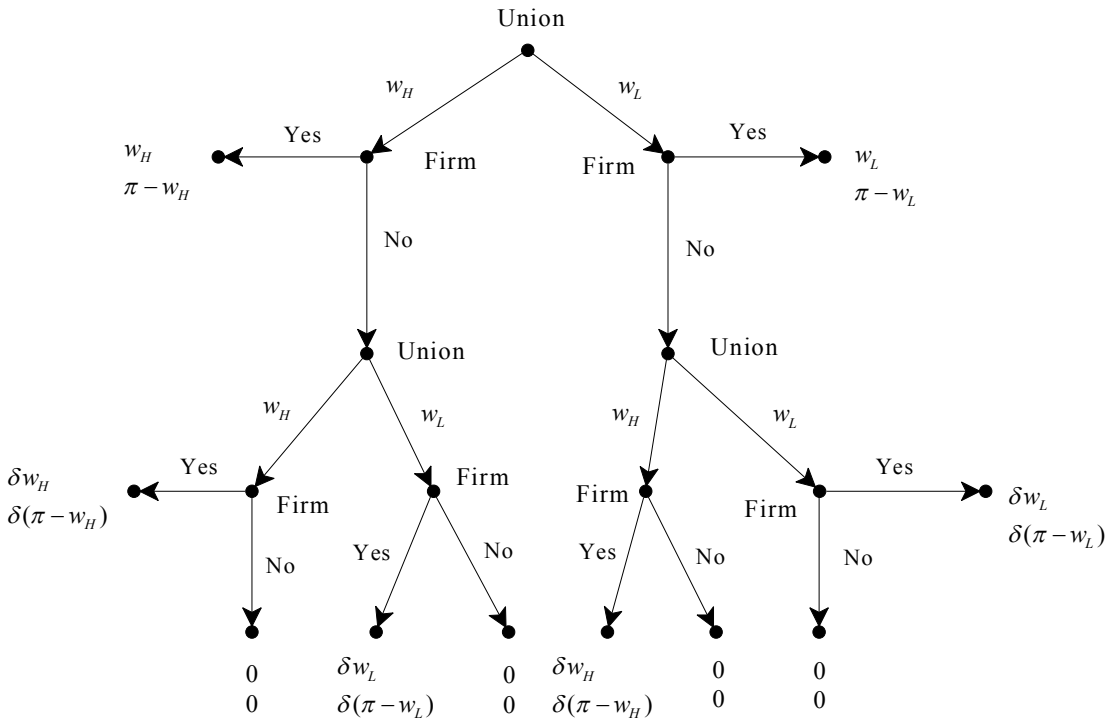
PE-2:

a	b
$\frac{1}{2}$	$\frac{1}{2}$

Payoffs are as follows: Top: PE-1, Middle: Incumbent, Bottom: PE-2.




NATURE
a
(1/2)
b
(1/2)
PE-1
PE-1
in
out
in
out
INCUMBENT
INCUMBENT
AG
CO
AG
CO
PE-2
PE-2
PE-2
IN
OUT
IN
OUT
IN
OUT
IN
OUT
IN
OUT
IN
OUT
0
4
0
0
7
1
1.5
3.5
0
1.5
6.5
1
1
7
0
1
10
1
0
1.5
1.5
0
5
1
1.5
3
1.5
1
6.5
1.5
1.5
6.5
1
1
10
1
IN: 1/2 0 + 1/2 (1.5) =
= 0.75
OUT: 1



$\pi = \pi_H$ $\pi = \pi_L$

The game with $\pi = \pi_H$

The game with $\pi = \pi_L$

Union: • α $1-\alpha$ •

two-sided

Firm: ⊙ ⊙

$\pi_H > \pi_L > 0$ $w_H > w_L > 0$ $\pi_L - w_H < 0$

$\pi_H - w_H > 0$

For what value of α and δ and π_H, π_L w_H, w_L is this a WSE