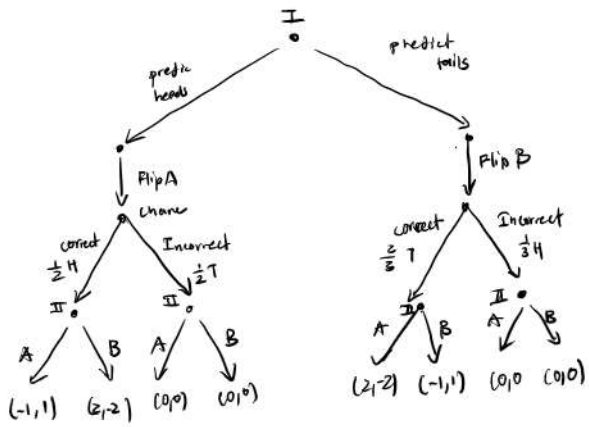
Ext 2

① coin A has ½ heads, ½ tails
coin B has ⅓ heads, ⅔ tails
player 1 must predict heads or tails

② If predict heads, A is tossed
If predict tails, B is tossed

③ Player 2 informs player 1 if prediction was right/wrong
then must guess whether coin A or coin B is used

④ p2 correct wins \$1 from p1
p1 incorrect, P1 correct, P1 wins \$1 from P2
p1 and p2 wrong, no payoff



b) GAME MATRIX

I / II	AA	AB	BA	BB
heads	$(-\frac{1}{2}, \frac{1}{2})$	$(-\frac{1}{2}, \frac{1}{2})$	$(1, -1)$	$(1, -1)$
tails	$(\frac{4}{3}, -\frac{4}{3})$	$(\frac{4}{3}, -\frac{4}{3})$	$(-\frac{2}{3}, \frac{2}{3})$	$(-\frac{2}{3}, \frac{2}{3})$

Equivalent Strategy

Ext 3

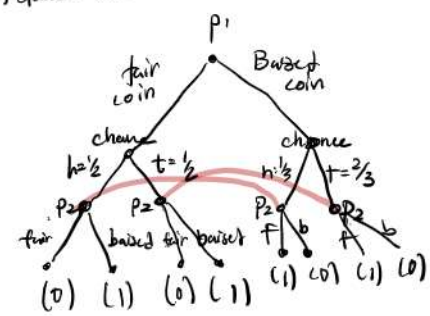
① P1 has 2 coins · one fair $h=\frac{1}{2}$, $t=\frac{1}{2}$
· second prob $h=\frac{1}{3}$, $t=\frac{2}{3}$

P1 knows which is fair, which is baised

② P1 selects 1 and tosses, P1 tells P2 the result

③ P2 must then guess fair or baised
if correct, no payoff
if incorrect, lose \$1

a) Game Tree



strategy of player i in an extensive game with perfect information specifies what action i will take for each history after which it is her turn to move. Ie, plan of action for all contingincys

b) Game Matrix

P2's strategy

P1/P2		FF	FB	BF	BB
P1's strategy	fair	0	1/2	1/2	1
	baised	1	1/3	2/3	0

Remove dominated column

$$A = \begin{array}{c} p \\ 1-p \end{array} \begin{bmatrix} 0 & \frac{1}{2} & 1 \\ 1 & \frac{1}{3} & 0 \end{bmatrix}$$

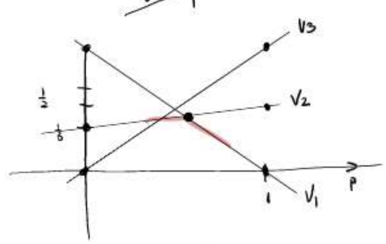
Graph

$v_1 = 1-p$

$v_2 = \frac{1}{2}p + \frac{1}{3}(1-p) = \frac{1}{6}p + \frac{1}{3}$

~~$v_3 = p$~~

$\frac{1}{6} + \frac{1}{3}$



$\frac{1}{6}p + \frac{1}{3} = 1-p$

$\frac{7}{6}p = \frac{2}{3}$

$p = \frac{4}{7}$, $1-p = \frac{3}{7}$

Value of game: $V = 1-p = \boxed{3/7}$

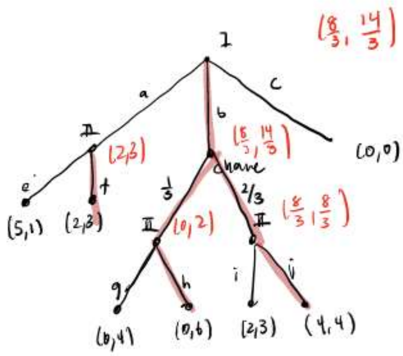
player 1 strat $(4/7, 3/7)$

$$\begin{bmatrix} 0 & \frac{1}{2} \\ 1 & \frac{1}{3} \end{bmatrix} \begin{bmatrix} q_1 \\ q_2 \end{bmatrix} = \begin{bmatrix} 3/7 \\ 3/7 \end{bmatrix}$$

player 2 strategy $(1/7, 6/7, 0, 0)$

Ex 4 PSE of following Game Tree

(pure strategy equilibrium)



$2+\frac{8}{3}$

GAME MATRIX

I/II	eg	eh	fg	fh	gi	gj	hi	hj
a	$(5,1)$	$(5,1)$	~~$(2,3)$~~	~~$(2,3)$~~	$(0,0)$	$(0,0)$	$(0,0)$	$(0,0)$
b	$(0,\frac{4}{3})$	$(0,2)$	$(0,\frac{4}{3})$	$(0,2)$	$(\frac{4}{3},\frac{10}{3})$	$(\frac{8}{3},4)$	$(\frac{4}{3},4)$	~~$(\frac{8}{3},\frac{14}{3})$~~
c	$(0,0)$	$(0,0)$	$(0,0)$	$(0,0)$	$(0,0)$	$(0,0)$	$(0,0)$	$(0,0)$

$(0,\frac{4}{3})+(\frac{4}{3},2)$

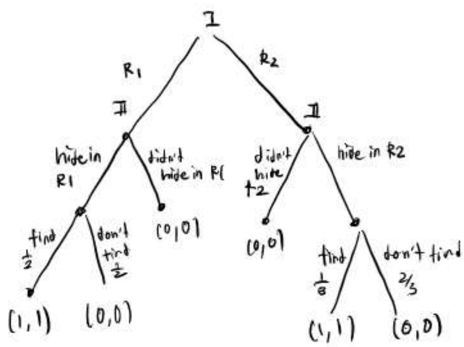
$(0,2)+(\frac{8}{3},\frac{8}{3})$

$(0,2)+(\frac{4}{3},2)$

$(0,\frac{4}{3})+(\frac{8}{3},\frac{8}{3})$

Ex 5 : PSE of Silver Dollar

GAME TREE



PSE
- player 1's payoff that is max of col
- player 2's payoff that is max of row

GAME MATRIX

I/II	hide room 1	hide room 2
R1 / Find	$(\frac{1}{2}^*,\frac{1}{2}^*)$	$(0,0)$
R1 / Don't Find	$(0,0)$	$(0,0)$
R2/Find	$(0,0)$	$(\frac{1}{3}^*,\frac{1}{3}^*)$
R2 / Don't Find	$(0,0)$	$(0,0)$

→ PSE

Ext 6

(a)
$$\begin{pmatrix} (-3,-4) & (2^*,-1) & (0,6^*) & (1^*,1) \\ (2^*,0) & \boxed{(2^*,2^*)} & (-3,0) & (1^*,-2) \\ (2^*,-3) & (-3,1^*) & (-1,-1) & (1^*,-3) \\ (-4,3^*) & (2^*,-5) & (1^*,2) & (-3,1) \end{pmatrix}$$

PSE

(b)
$$\begin{pmatrix} (0,0) & (1^*,-1) & \boxed{(1^*,1^*)} & (-1,0) \\ (-1,1^*) & (0,1) & (1^*,0) & (0^*,0) \\ (1^*,0) & (-1,-1) & (0,1^*) & (-1,1^*) \\ (1^*,-1) & (-1,0) & (1^*,-1) & \boxed{(0^*,0^*)} \\ \boxed{(1^*,1^*)} & (0,0) & (-1,-1) & (0^*,0) \end{pmatrix}$$

PSE

Ext 7 4000 Drivers from A to B

$$\begin{tikzcd} A \arrow[r, "T/100"] \arrow[d, "45"'] & U \arrow[d, "45"] \arrow[dl, "0"'] \\ R \arrow[r, "T/100"'] & B \end{tikzcd}$$

T is number of drivers using this road segment

4000 person game, each player with three strategy

AUB

ARB

AURB

without UR,

2000/100 +45 is average, 65

show that AURB is PSE

2000 cars were to use AURB, time is 2000/100 + 2000/100 or 40

Clearly Best strategy, but people using ARB also know this.

So they also use AURB,

causing 4000 to use the highway, causing

the nash equilibrium to be 4000/100 + 4000/100 = 80 !