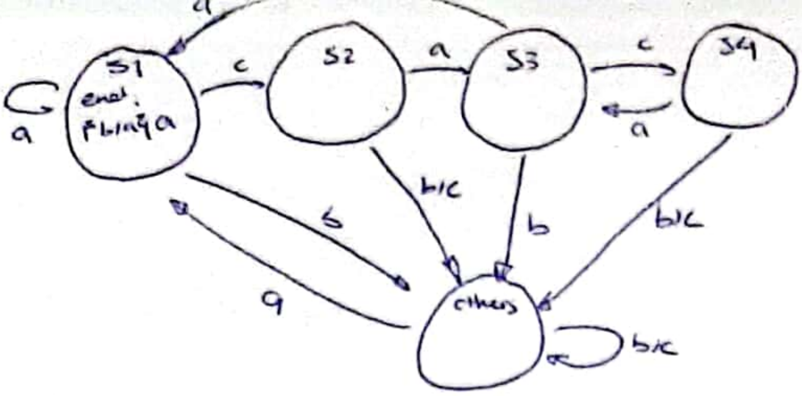
$P(a) = P(A)\,p(a|A) + P(B)\,p(b|B) + P(C)\,p(c|C) = 0.26$

$P(c) = 0.26$

$P(b) = 0.48$



$p(b) = 1-2q \quad , \quad p(a) = p(c) = q$

stationary

$$\pi \begin{bmatrix} q & q & 0 & 0 & 1-2q \\ 0 & 0 & q & 0 & 1-q \\ q & 0 & 0 & q & 1-2q \\ 0 & 0 & q & 0 & 1-q \\ q & 0 & 0 & 0 & 1-q \end{bmatrix} = \pi$$

I $\quad q(\pi_1 + \pi_3 + \pi_5) = \pi_1$

II $\quad q\pi_1 = \pi_2$

III $\quad q(\pi_2 + \pi_4) = \pi_3$

IV $\quad q\pi_3 = \pi_4$

V $\quad (1-2q)(\pi_1 + \pi_3) + (1-q)(\pi_2 + \pi_4 + \pi_5) = \pi_5$

V $\quad \pi_2 + \pi_4 + \pi_5 = 1 - \pi_1 - \pi_3$

$\Rightarrow (1-2q)(\pi_1 + \pi_3) + (1-q)(1 - \pi_1 - \pi_3) = \pi_5 \longrightarrow$ VI

$\Rightarrow \underbrace{[(1-2q) - (1-q)]}_{-q}(\pi_1 + \pi_3) + (1-q) = \pi_5$

III $\quad q\pi_2 + \pi_4 = \frac{1}{q}\pi_3 \xrightarrow{\text{II} \,\&\, \text{IV}} q\pi_1 + q\pi_3 = \frac{1}{q}\pi_3 \Rightarrow$

$\pi_1 + \pi_3 = \frac{1}{q^2}\pi_3 \Rightarrow \pi_1 = \left(\frac{1}{q^2} - 1\right)\pi_3$ VII

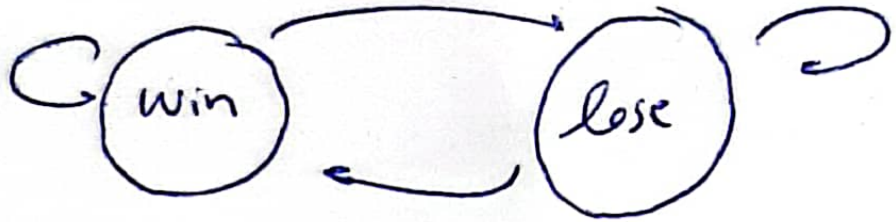
VII $\xrightarrow{\text{I}} (1-q)\pi_1 = \pi_3 + \pi_5 \Rightarrow (1-q)\left(\frac{1}{q^2} - 1\right)\pi_3 = \pi_3 + \pi_5$

$\Rightarrow \pi_5 = \left((1-q)\left(\frac{1}{q^2} - 1\right) - 1\right)\pi_3$

$\xrightarrow{\text{V}} -q\left(\left(\frac{1}{q^2} - 1 + 1\right)\pi_3\right) + (1-q) = \left((1-q)\left(\frac{1}{q^2} - 1\right) - 1\right)\pi_3$

$\Rightarrow -\frac{1}{q}\pi_3 + (1-q) = \left(\frac{1-q}{q^2} - 1 + q\right)\pi_3 \Rightarrow \boxed{\pi_3 = \frac{1-q}{\frac{1}{q^2} - 1 + q}} \Rightarrow \boxed{\pi_4 = \frac{q(1-q)}{\frac{1}{q^2} - 1 + q}}$

Super Model



$$\lambda_{win}^{\text{stationary}} = \lambda_3 \times 0.5 + (1-\lambda_3) \times 10^{-4}$$

$$\underset{win}{Exp}[\text{steps}] = \frac{1}{\lambda_{win}} = \frac{1}{\lambda_3 \times 0.5 + (1-\lambda_3) \times 10^{-4}}$$

$$\text{profit Rate} = \text{Cost} - \lambda_{win}^{\text{stationary}} \times \text{Prize}$$

(2 [illegible]

$\underset{X_1, X_2, X_3}{\mathrm{Argmax}}\ P(cac \mid A X_1 X_2 X_3)$

(I) $P(c \mid A X_1)$

	A	B	C
X_1	0.2	0.2	0.4

(II) $\max_{X_1} P(ca \mid A X_1 X_2) = P(c \mid A X_1)\, P(a \mid X_1 X_2)$

max

	$X_2 = A$	$X_2 = B$	$X_2 = C$
$X_1 = A$	0.2×0.4	0.2×0.2	0.2×0.2
$X_1 = B$	0.2×0.4	0.2×0.2	0.2×0.2
$X_1 = C$	0.4×0.1	0.4×0.2	0.4×0.2

	A	B	C
X_2	0.08	0.08	0.08
	$(X_1 = A/B)$	$(X_1 = C)$	$(X_1 = C)$

(III) $\max_{X_1, X_2} P(cac \mid A X_1 X_2 X_3) = \max P(ca \mid A X_1 X_2)\, P(c \mid X_2 X_3)$

max

	$X_3 = A$	$X_3 = B$	$X_3 = C$
$X_2 = A$	0.08×0.2	0.08×0.2	0.08×0.4
$X_2 = B$	0.08×0.2	0.08×0.2	0.08×0.4
$X_2 = C$	0.08×0.4	0.08×0.2	0.08×0.4

	A	B	C
X_3	0.032	0.016	0.032
	$X_2 = C$	$X_2 = *$	$X_2 = *$

محتمل ترین سیرهای موجود :

CCA ; CCC ; CBC ; BBC ; ABC