p_{ij}	$\{1,2\}$	3	$\{4,5,8,7\}$	6	$\{9\}$
$\{1,2\}$	1	0	0	0	0
3	$\frac{1}{3}$	0	0	$\frac{1}{3}$	$\frac{1}{3}$
$\{4,5,8,7\}$	0	0	1	0	0
6	0	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	0
$\{9\}$	0	0	0	0	1

$$u_{3,c_1} = \frac{1}{3} + \frac{1}{3} u_{6,c_1}$$

$$u_{6,c_1} = \frac{1}{4} u_{3,c_1} + \frac{1}{4} u_{6,c_1}$$

$$u_{6,c_1} = \frac{1}{12} + \frac{1}{12} u_{6,c_1} + \frac{1}{4} u_{6,c_1}$$

$$\boxed{u_{6,c_1} = \frac{1}{8}}$$

solve $u_{3,c_1} = \frac{1}{3}(1 + u_{6,c_1}) \Rightarrow \boxed{u_{3,c_1} = \frac{3}{8}}$

$$u_{3,c_2} = \frac{1}{3} u_{6,c_2}$$

$$u_{6,c_2} = \frac{1}{2} + \frac{1}{4} u_{3,c_2} + \frac{1}{4} u_{6,c_2}$$

$$\boxed{u_{6,c_2} = \frac{3}{4}} \qquad \boxed{u_{3,c_2} = \frac{1}{4}}$$

$$u_{3,c_3} = \frac{1}{3} + \frac{1}{3} u_{6,c_3}$$

$$\boxed{u_{6,c_3} = \frac{1}{8}} \qquad \boxed{u_{3,c_3} = 3/8}$$

setting up stationary distribution question for chain.

p_{ij}	1	2
1	$\frac{2}{3}$	$\frac{1}{3}$
2	$\frac{1}{4}$	$\frac{3}{4}$

$$\sigma_1 = \frac{2}{3}\sigma_1 + \frac{1}{4}\sigma_2$$

$$\sigma_2 = \frac{1}{3}\sigma_1 + \frac{3}{4}\sigma_2 \qquad \sigma_1 + \sigma_2 = 1.$$

$$\boxed{\sigma_1 = \frac{3}{4}\sigma_2} \Rightarrow \boxed{\sigma_2 = \frac{4}{7}} \qquad \boxed{\sigma_1 = 3/7}$$

	4	5	8	7
4	0	$1/2$	$1/2$	0
5	$1/3$	0	0	$2/3$
8	$1/2$	0	0	$1/2$
7	0	$3/4$	$1/4$	0

$$6_4 = \frac{1}{3} 6_5 + \frac{1}{2} 6_8$$

$$6_5 = \frac{1}{2} 6_4 + \frac{3}{4} 6_7.$$

$$6_8 = \frac{1}{2} 6_4 + \frac{1}{4} 6_7.$$

$$6_7 = \frac{2}{3} 6_5 + \frac{1}{2} 6_8$$

solving them we get.

$$6_7 = \frac{14}{46}, \quad 6_5 = \frac{15}{46}, \quad 6_8 = \frac{8}{46}, \quad 6_4 = \frac{9}{46}$$