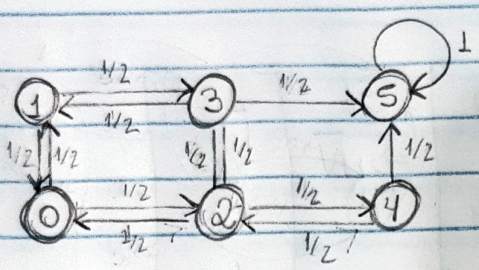
Simul - Lista 3

1)

1	3	5 G
O R	2	4

A cada $t = t + 1$ o rato vai para uma sala vizinha com igual prob.

a)



b) $P_{ij} =$

$$\begin{bmatrix} 0 & 1/2 & 1/2 & 0 & 0 & 0 \\ 1/2 & 0 & 0 & 1/2 & 0 & 0 \\ 1/2 & 0 & 0 & 0 & 1/2 & 0 \\ 0 & 1/2 & 0 & 0 & 0 & 1/2 \\ 0 & 0 & 1/2 & 0 & 0 & 1/2 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix} \begin{matrix} = 1 \\ = 1 \\ = 1 \\ = 1 \\ = 1 \\ = 1 \end{matrix}$$

c) R em 5 depois de 3h

$$P = \left(\tfrac{1}{2} \cdot \tfrac{1}{2} \cdot \tfrac{1}{2}\right) + \left(\tfrac{1}{2} \cdot \tfrac{1}{2} \cdot \tfrac{1}{2}\right) + \left(\tfrac{1}{2} \cdot \tfrac{1}{2} \cdot \tfrac{1}{2}\right) = 3\left(\tfrac{1}{8}\right) = 3/8$$

$P(t=3) = 3/8$

d) $N_{médio} =$

$$\begin{bmatrix} 10 \\ 9 \\ 9 \\ 6 \\ 6 \\ 1 \end{bmatrix}$$

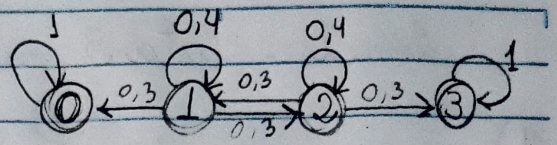
d)

$$N = \begin{bmatrix} 1 & -1/2 & -1/2 & 0 & 0 & 0 \\ -1/2 & 1 & 0 & -1/2 & 0 & 0 \\ -1/2 & 0 & 1 & 0 & -1/2 & 0 \\ 0 & -1/2 & 0 & 1 & 0 & -1/2 \\ 0 & 0 & -1/2 & 0 & 1 & -1/2 \\ 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix}^{-1} = \begin{bmatrix} 3 & 2 & 2 & 1 & 1 & 1 \\ 2 & 2{,}66 & 1{,}33 & 1{,}33 & 0{,}66 & 1 \\ 2 & 1{,}33 & 2{,}66 & 0{,}66 & 1{,}33 & 1 \\ 1 & 1{,}33 & 0{,}66 & 1{,}66 & 0{,}33 & 1 \\ 1 & 0{,}66 & 1{,}33 & 0{,}33 & 1{,}66 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

2)

A	M		A
0	1	2	3

a)



b)

$$Q = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0,3 & 0,4 & 0,3 & 0 \\ 0 & 0,3 & 0,4 & 0,3 \\ 0 & 0 & 0 & 1 \end{bmatrix} \begin{matrix} =1 \\ =1 \\ =1 \\ =1 \end{matrix}$$

c) $P(t=3) = (0,4)^3 + (0,4 \cdot 0,3^2) + (0,3^3)$

$P(t=3) = 0,064 + 0,49 + 0,027$

$P(t=3) = 0,581 = 58,1\%$

d)

$$N = (I-Q)^{-1} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ -0,75 & 2,5 & 0 & 0 \\ -3/4 & 0 & 2,5 & -3/4 \\ 0 & 0 & 0 & 1 \end{bmatrix} \Rightarrow \bar{N}^0 \begin{bmatrix} 1 \\ 1,75 \\ 1 \\ 1 \end{bmatrix} \qquad R = \begin{bmatrix} 1 & 0 \\ 0,3 & 0 \\ 0 & 0,3 \\ 0 & 1 \end{bmatrix}$$

e)

$B = N \cdot R$

$$B = \begin{bmatrix} 1 & 0 \\ 0 & 0 \\ -3/4 & 0 \\ 0 & 1 \end{bmatrix}$$