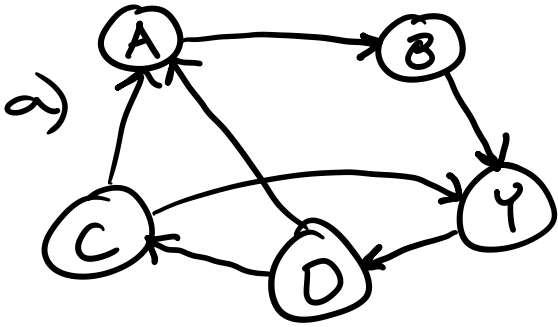


Weekly Problems 5 - Solution

Sunday, February 11, 2024 4:41 PM



b)

$$A = \begin{matrix} & \begin{matrix} A & B & C & D & Y \end{matrix} \\ \begin{matrix} A \\ B \\ C \\ D \\ Y \end{matrix} & \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix} \end{matrix}$$

$$D^{-1} = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 1 \end{bmatrix}$$

$$D^{-1}A = \begin{bmatrix} 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 \\ \frac{1}{2} & 0 & 0 & 0 & \frac{1}{2} \\ \frac{1}{2} & 0 & \frac{1}{2} & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \end{bmatrix}$$

$$M = (D^{-1}A)^T = \begin{bmatrix} 0 & 0 & \frac{1}{2} & \frac{1}{2} & 0 \\ 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \frac{1}{2} & 0 \\ 0 & 0 & 0 & 0 & 1 \\ 0 & 1 & \frac{1}{2} & 0 & 0 \end{bmatrix}$$

c)

$$p_0 = \begin{bmatrix} \frac{1}{5} \\ \frac{1}{5} \\ \frac{4}{5} \\ \frac{1}{5} \\ \frac{1}{5} \end{bmatrix}$$

$$M p_0 = \begin{bmatrix} \frac{2}{10} \\ \frac{2}{10} \\ \frac{1}{10} \\ \frac{2}{10} \\ \frac{3}{10} \end{bmatrix}$$

You win!