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Section: A.

Q.1)

Given,

$m' = [1 \quad 8 \quad 0 \quad 1]$.

$m = [1 \quad 0 \quad 1 \quad 0]$. $D = \begin{bmatrix} 0 & -1 & -1 & 0 \\ 0 & 2 & 1 & -1 \\ 0 & 0 & -1 & 1 \end{bmatrix}$

firing seq. $(\sigma) = ?$

$e_j = ?$

$m' = m + e_j D$.

$$[1 \quad 8 \quad 0 \quad 1] = [1 \quad 0 \quad 1 \quad 0] + e_j \begin{bmatrix} 0 & -1 & -1 & 0 \\ 0 & 2 & 1 & -1 \\ 0 & 0 & -1 & 1 \end{bmatrix}$$

$$[1 \quad 8 \quad 0 \quad 1] - [1 \quad 0 \quad 1 \quad 0] = e_j \begin{bmatrix} 0 & -1 & -1 & 0 \\ 0 & 2 & 1 & -1 \\ 0 & 0 & -1 & 1 \end{bmatrix}.$$

$$= [0 \quad 8 \quad -1 \quad 1] = e_j \begin{bmatrix} 0 & -1 & -1 & 0 \\ 0 & 2 & 1 & -1 \\ 0 & 0 & -1 & 1 \end{bmatrix}.$$

$$= [0 \quad 8 \quad -1 \quad 1] = [e_1 \quad e_2 \quad e_3] \begin{bmatrix} 0 & -1 & -1 & 0 \\ 0 & 2 & 1 & -1 \\ 0 & 0 & -1 & 1 \end{bmatrix}.$$

$$= [0 \quad 8 \quad -1 \quad 1] = [0 \quad -e_1 + 2e_2 \quad -e_1 + e_2 - e_3 \quad -e_2 + e_3].$$

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$= [0 \quad 8 \quad -1 \quad 1] = [0 \quad -e_1+2e_2 \quad -e_1+e_2-e_3 \quad -e_2+e_3].$

Equating the matrix,

$-e_1 + 2e_2 = 8.$

$-e_1 + e_2 - e_3 = -1.$

$-e_2 + e_3 = 1.$

Solving them simultaneously,

we get.

$e_1 = 0$

$e_2 = 4$

$e_3 = 5$

So, the firing sequence will be,

$e_j = [0 \quad 4 \quad 5].$ Ans.

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(3) (3)

Q.2)

Given :

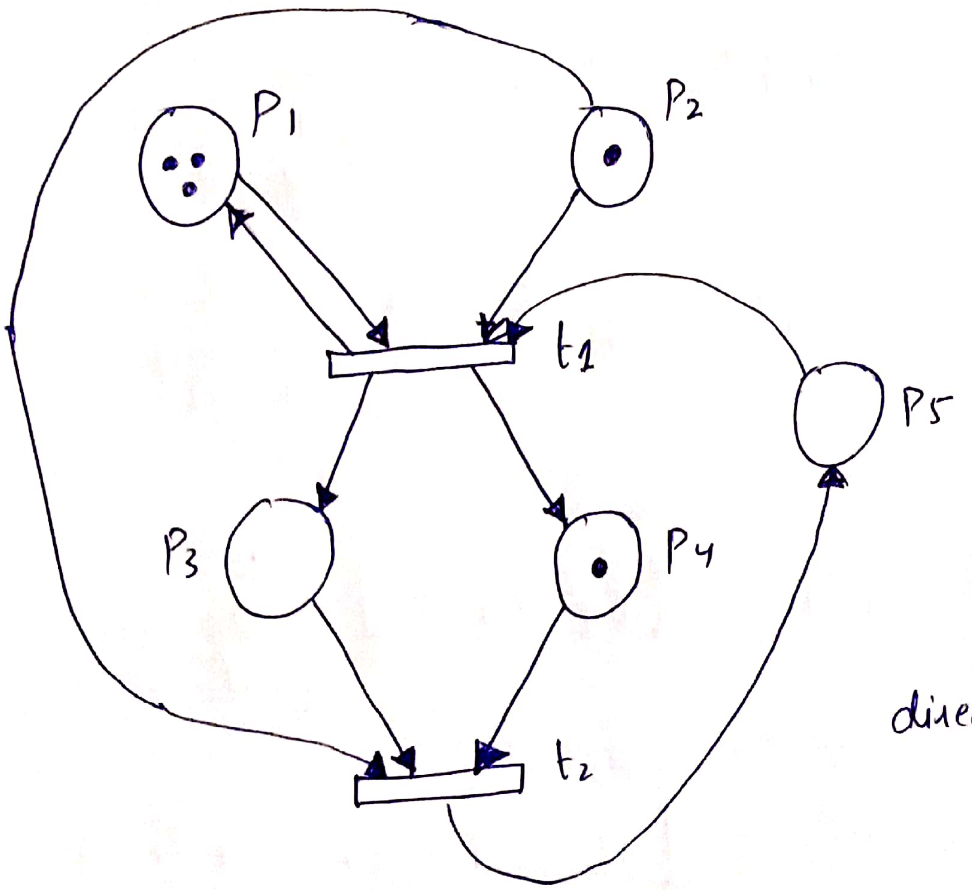
$P = \{p_1, p_2, p_3, p_4, p_5\}$.

$T = \{t_1, t_2\}$.

$I = \{(p_1, t_1), (p_2, t_1), (p_2, t_2), (p_3, t_2), (p_4, t_2), (p_5, t_1)\}$

$O = \{(t_1, p_4), (t_2, p_5), (t_1, p_1), (t_1, p_3)\}$.

$m = \{3, 1, 0, 1, 0\}$.



directed graph.