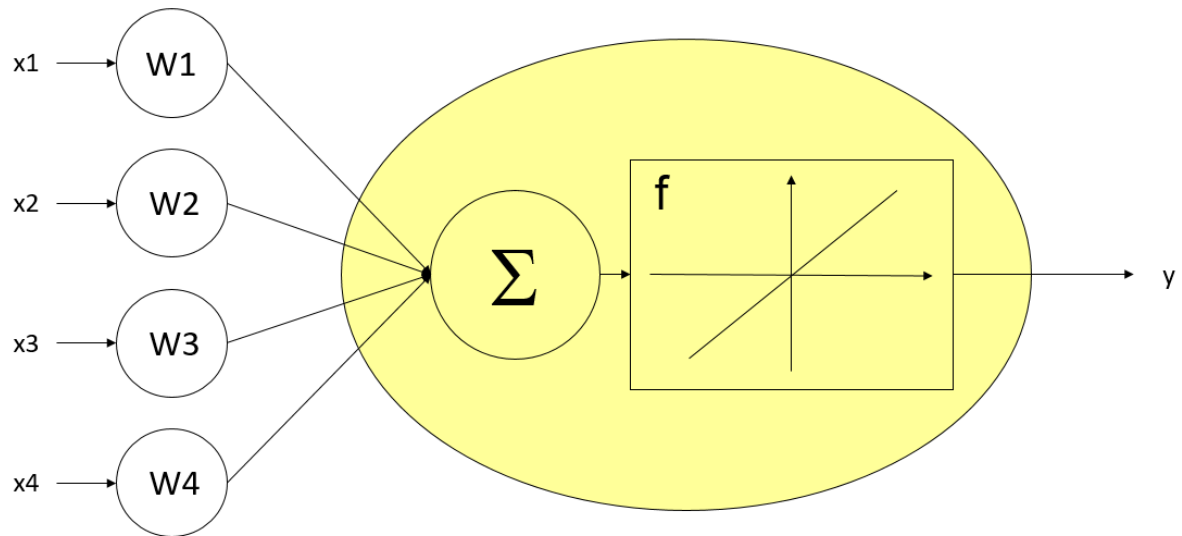


5.

a)



b)

$$\mathbf{w} = [w_1 \ w_2 \ w_3 \ w_4]^T \quad \mathbf{X}^T * \mathbf{w} = \mathbf{y}$$

$$\begin{bmatrix} 1/2 & 1/2 & -1/2 & -1/2 \\ 1/2 & -1/2 & 1/2 & -1/2 \end{bmatrix} * \begin{bmatrix} w_1 \\ w_2 \\ w_3 \\ w_4 \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix}$$

$p < n$ : desni pseudoinverz

$$\mathbf{w} = \mathbf{X}(\mathbf{X}^T \mathbf{X})^{-1} \mathbf{y}$$

$$\mathbf{X}^T \mathbf{X} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad (\mathbf{X}^T \mathbf{X})^{-1} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \quad \mathbf{X}(\mathbf{X}^T \mathbf{X})^{-1} = \begin{bmatrix} 1/2 & 1/2 \\ 1/2 & -1/2 \\ -1/2 & 1/2 \\ -1/2 & -1/2 \end{bmatrix} = \mathbf{X}^+$$

$$\mathbf{w} = \mathbf{X}^+ * \mathbf{y} = \begin{bmatrix} 1/2 & 1/2 \\ 1/2 & -1/2 \\ -1/2 & 1/2 \\ -1/2 & -1/2 \end{bmatrix} * \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix}$$

c)

$$\mathbf{w}^{(0)} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\mathbf{e}^{(0)} = \begin{bmatrix} 1/2 & 1/2 & -1/2 & -1/2 \\ 1/2 & -1/2 & 1/2 & -1/2 \end{bmatrix} * \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

$$\mathbf{w}^{(1)} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 1/2 & 1/2 \\ 1/2 & -1/2 \\ -1/2 & 1/2 \\ -1/2 & -1/2 \end{bmatrix} * \begin{bmatrix} -1 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix}$$

$$\mathbf{e}^{(1)} = \begin{bmatrix} 1/2 & 1/2 & -1/2 & -1/2 \\ 1/2 & -1/2 & 1/2 & -1/2 \end{bmatrix} * \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix} - \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 1 \\ -1 \end{bmatrix} - \begin{bmatrix} 1 \\ -1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\mathbf{w}^{(2)} = \mathbf{w}^{(1)} - \begin{bmatrix} 1/2 & 1/2 \\ 1/2 & -1/2 \\ -1/2 & 1/2 \\ -1/2 & -1/2 \end{bmatrix} * \begin{bmatrix} 0 \\ 0 \end{bmatrix} = \mathbf{w}^{(1)} \quad \mathbf{w} = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix}$$

d)

$$\mathbf{w}^{(0)} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\mathbf{e}^{(0)} = [1/2 \quad 1/2 \quad -1/2 \quad -1/2] * \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} - [1] = [-1]$$

$$\mathbf{w}^{(1)} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} - \begin{bmatrix} 1/2 \\ 1/2 \\ -1/2 \\ -1/2 \end{bmatrix} * [-1] = \begin{bmatrix} 1/2 \\ 1/2 \\ -1/2 \\ -1/2 \end{bmatrix}$$

$$\mathbf{e}^{(1)} = [1/2 \quad -1/2 \quad 1/2 \quad -1/2] * \begin{bmatrix} 1/2 \\ 1/2 \\ -1/2 \\ -1/2 \end{bmatrix} - [-1] = [1]$$

$$\mathbf{w}^{(2)} = \begin{bmatrix} 1/2 \\ 1/2 \\ -1/2 \\ -1/2 \end{bmatrix} - \begin{bmatrix} 1/2 \\ -1/2 \\ 1/2 \\ -1/2 \end{bmatrix} * [1] = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix}$$

$$\mathbf{e}^{(2)} = [1/2 \quad 1/2 \quad -1/2 \quad -1/2] * \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix} - [1] = [0]$$

$$\mathbf{w}^{(3)} = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix} - \begin{bmatrix} 1/2 \\ 1/2 \\ -1/2 \\ -1/2 \end{bmatrix} * [0] = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix} = \mathbf{w}^{(2)}$$

$$\mathbf{w} = \begin{bmatrix} 0 \\ 1 \\ -1 \\ 0 \end{bmatrix}$$

6.

c = 1200 kn

	knjiga	rukavice	naočale	cipele	šator	lopta
200	0	6	6	6	6	6
400	10	10	10	10	10	10
600	10	16	19	19	19	19
800	10	16	25	25	25	25
1000	10	16	29	29	29	29
1200	10	16	35	35	35	35

$v_{\max} = 35$

Odabrane stvari: knjiga, rukavice, naočale