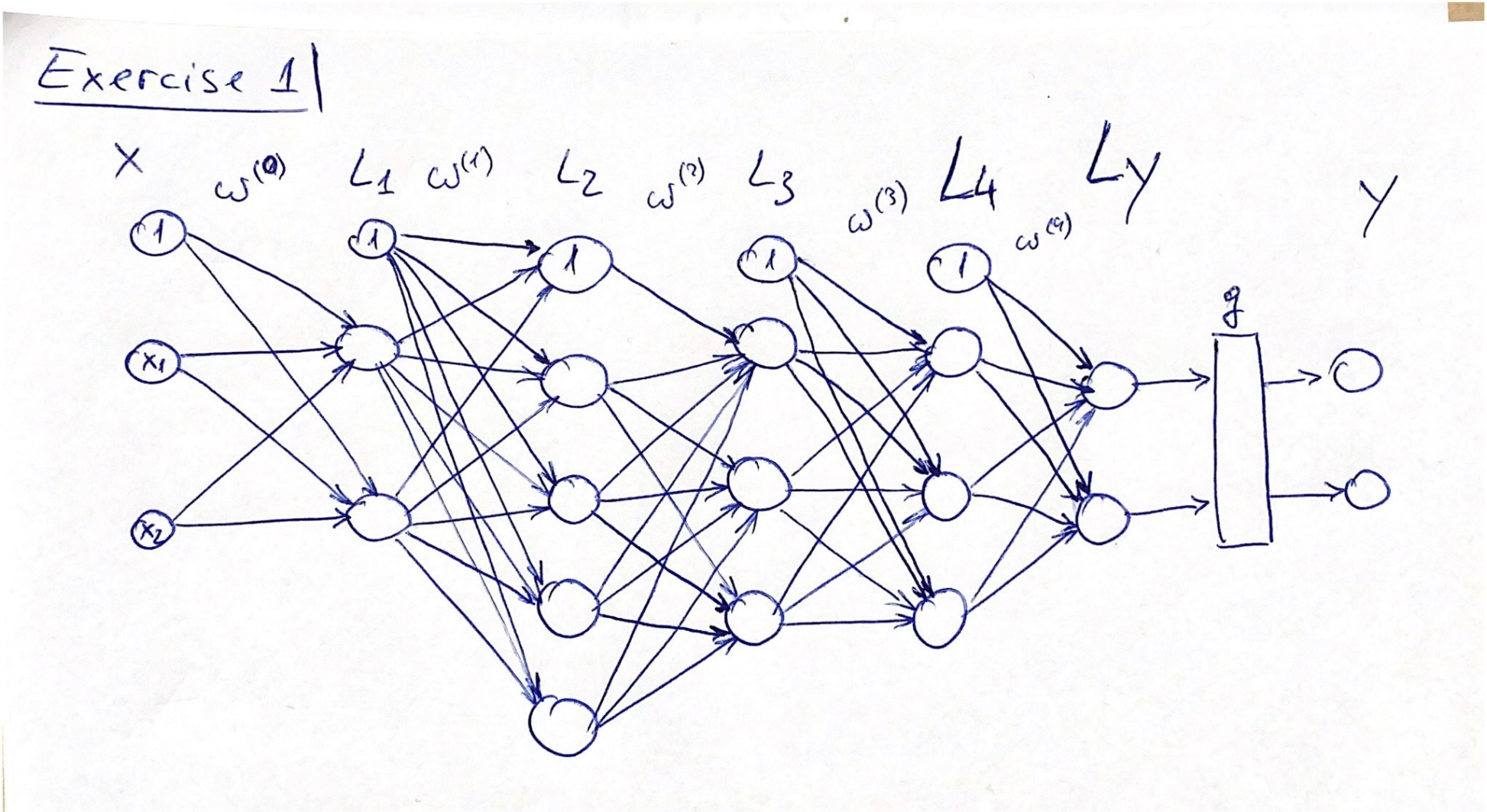
Exercise 1



Exercise 2

1st hidden layer

$$A_1 = W^{(1)} X = \begin{bmatrix} 0.2 & 0.1 \\ 0.3 & 0.0 \\ 0.1 & 0.4 \end{bmatrix} \begin{bmatrix} 1 \\ 2 \end{bmatrix} = \begin{bmatrix} 0.4 \\ 0.3 \\ 0.9 \end{bmatrix}$$

$$L_1 = \sigma(A_1) = \begin{bmatrix} \sigma(0.4) \\ \sigma(0.3) \\ \sigma(0.9) \end{bmatrix} = \begin{bmatrix} 0.60 \\ 0.57 \\ 0.71 \end{bmatrix}$$

2nd hidden layer.

$$A_2 = W^{(2)} L_1 = \begin{bmatrix} 0.1 & 0.2 & 0.5 \\ 0.2 & 0.1 & 0.4 \end{bmatrix} \begin{bmatrix} 0.60 \\ 0.57 \\ 0.71 \end{bmatrix} = \begin{bmatrix} 0.53 \\ 0.46 \end{bmatrix}$$

$$L_2 = \sigma(A_2) = \begin{bmatrix} \sigma(0.53) \\ \sigma(0.46 \end{bmatrix} = \begin{bmatrix} 0.63 \\ 0.61 \end{bmatrix}$$

3rd layer (output)

$$A_3 = W^{(3)} L_2 = \begin{bmatrix} 0.1 & 0.1 \end{bmatrix} \begin{bmatrix} 0.63 \\ 0.61 \end{bmatrix} = \boxed{0.124}$$

$$L_3 = A_3 \cdot I = 0.124 \cdot 1 = 0.124$$