

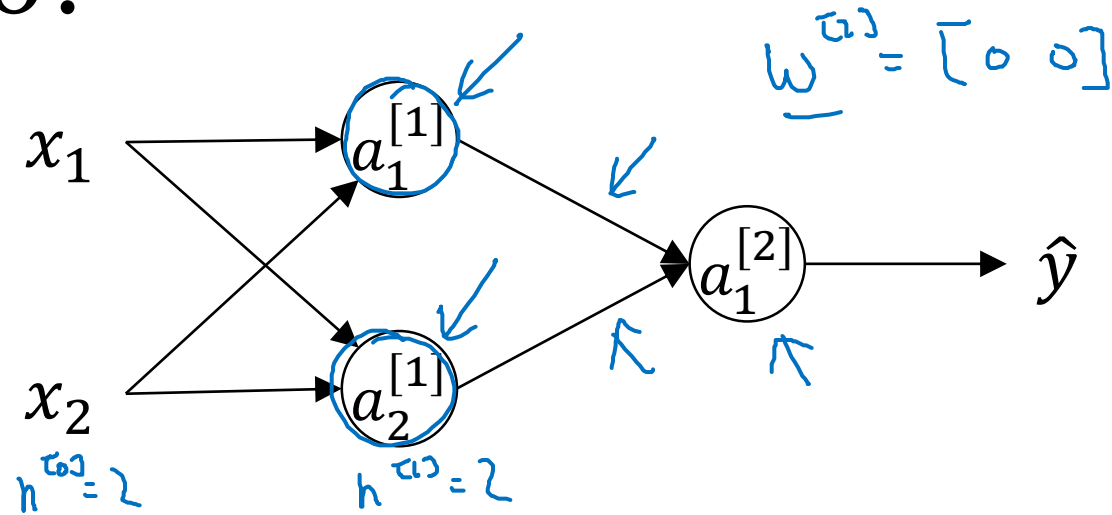


deeplearning.ai

One hidden layer
Neural Network

Random Initialization

What happens if you initialize weights to zero?



$$W^{(1)} = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$$

$$a_1^{(1)} = a_2^{(1)}$$

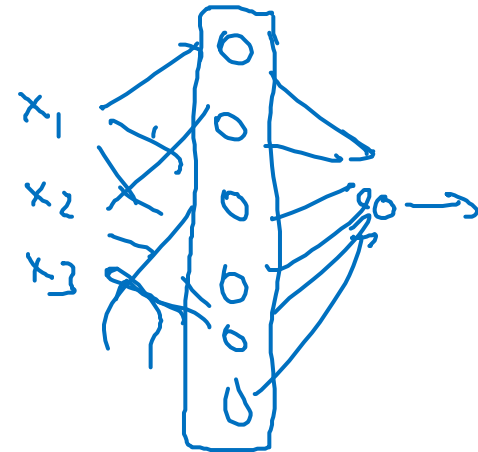
$$\Delta W = \begin{bmatrix} u & v \\ u & v \end{bmatrix}$$

$$b^{(1)} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\Delta z_1 = \Delta z_2$$

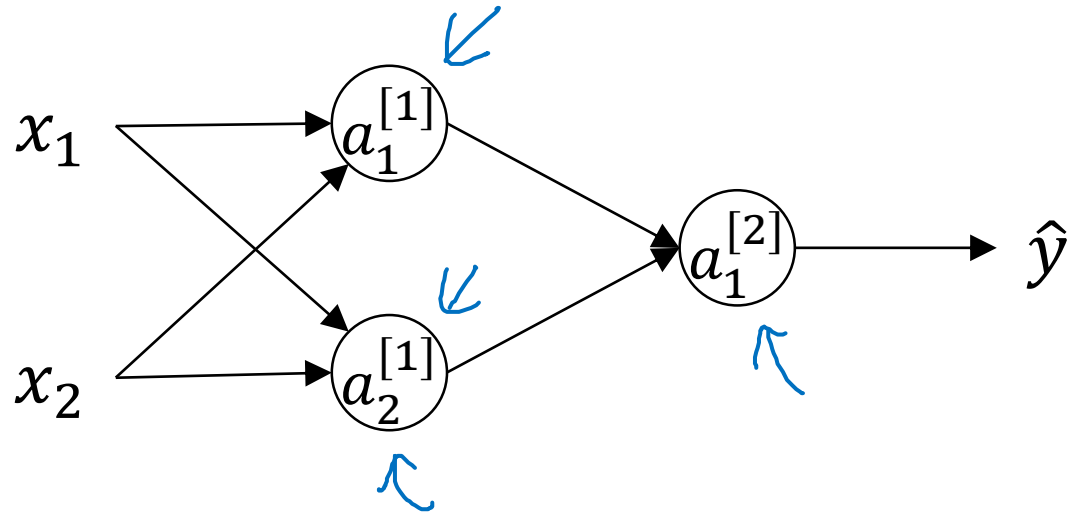
$$W^{(1)} = W^{(1)} - \alpha \Delta W$$

Symmetric

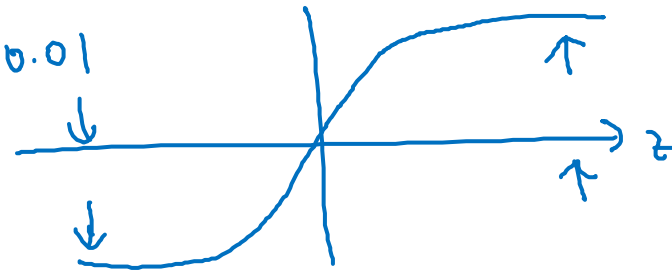


$$W^{(1)} = \begin{bmatrix} \dots & \cdot \\ \dots & \cdot \end{bmatrix}$$

Random initialization



→ $w^{[1]} = \text{np.random.randn}(2,2) * \frac{0.01}{100?}$
 $b^{[1]} = \text{np.zeros}(2,1)$
 $w^{[2]} = \text{np.random.randn}(1,2) * 0.01$
 $b^{[2]} = 0$



$$z^{[1]} = w^{[1]}x + b^{[1]}$$
$$a^{[1]} = g^{[1]}(z^{[1]})$$