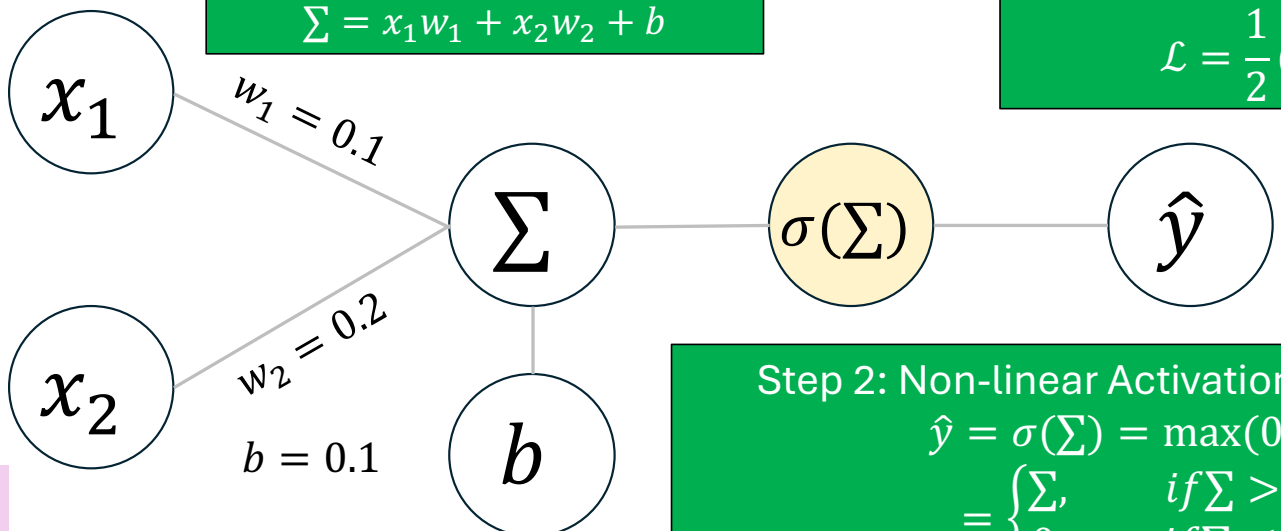
Backpropagation

$Parameters\ w_1, w_2, b$ ← $Loss\ \mathcal{L}$



$Input\ X = (1, 2)$

$$w_1^{new} = w_1 - \eta \frac{\partial \mathcal{L}}{\partial w_1}$$

$$w_2^{new} = w_2 - \eta \frac{\partial \mathcal{L}}{\partial w_2}$$

$$b^{new} = b - \eta \frac{\partial \mathcal{L}}{\partial b}$$

Assume $\eta = 0.1$

$$\frac{\partial \mathcal{L}}{\partial w_1} = \frac{\partial \mathcal{L}}{\partial \hat{y}} \cdot \frac{\partial \hat{y}}{\partial \sum} \cdot \frac{\partial \sum}{\partial w_1} = \frac{\partial \mathcal{L}}{\partial \sum} \cdot x_1$$

$$\frac{\partial \mathcal{L}}{\partial w_2} = \frac{\partial \mathcal{L}}{\partial \sum} \cdot x_2 \qquad \frac{\partial \mathcal{L}}{\partial b} = \frac{\partial \mathcal{L}}{\partial \sum} \cdot 1$$

$$\frac{\partial \mathcal{L}}{\partial \sum} = \frac{\partial \mathcal{L}}{\partial \hat{y}} \cdot \frac{\partial \hat{y}}{\partial \sum} = \begin{cases} \hat{y} - y, & if \sum > 0 \\ 0, & if \sum \leq 0 \end{cases} \qquad \frac{\partial \mathcal{L}}{\partial \hat{y}} = \hat{y} - y$$