Logistic regression algorithm

1: Initialize the weights at $t = 0$ to $\mathbf{w}(0)$

2: **for** $t = 0, 1, 2, \ldots$ **do**

3: Compute the gradient

$$\nabla E_{\text{in}} = -\frac{1}{N} \sum_{n=1}^{N} \frac{y_n \mathbf{x}_n}{1 + e^{y_n \mathbf{w}^{\intercal}(t) \mathbf{x}_n}}$$

4: Update the weights: $\mathbf{w}(t+1) = \mathbf{w}(t) - \eta \nabla E_{\text{in}}$

5: Iterate to the next step until it is time to stop

6: Return the final weights $\mathbf{w}$