Logistic Regression on m examples:

loss $J(w,b) = \frac{1}{m}\sum_{i=1}^{m} L(a^{(i)}, y)$

$a^{(i)} = \hat{y}^{(i)} = \sigma(z^{(i)}) = \sigma(w^T x^{(i)} + b)$

$\underline{\frac{\partial}{\partial w_1} J(w,b)} = \frac{1}{m}\sum_{i=1}^{m} \underbrace{\frac{\partial}{\partial w_i} L(a^{(i)}, y^{(i)})}_{\partial w_1^{(i)} \,-\, (x^{(i)}, y^{(i)})}$

initiate

$J = 0 \quad dw_1 = 0, dw_2 = 0, db = 0$

for $i = 1$ to m

$z^{(i)} = w^T x^{(i)} + b$

$a^{(i)} = \sigma(z^{(i)})$

$J \mathrel{+}= -[y^{(i)} \log a^{(i)} + (1 - y^{(i)}) \log(1 - a^{(i)})]$

$dz^{(i)} = a^{(i)} - y^{(i)}$

$dw_1 \mathrel{+}= x_1^{(i)} dz^{(i)}$

$dw_2 \mathrel{+}= x_2^{(i)} dz^{(i)}$ } assuming 2 features $n=2$

$db \mathrel{+}= dz^{(i)}$

$J /= m$

$dw_1 /= m, \; dw_2 /= m; \; db /= m$

$\partial w_1 = \frac{\partial J}{\partial w_1}$

$w_1 := w_1 - \alpha dw_1$

$w_2 := w_2 - \alpha dw_2$

$b := b - \alpha db$

Vectorization