Logistic Regression Gradient Descent

for one observation : $\hat{y} = a = \sigma(z)$ $z = w^T x + b$

X_1
W_1
X_2 $\boxed{z = w_1 x_1 + w_2 x_2 + b} \rightarrow \boxed{\hat{y} = a = \sigma(z)} \leftarrow \boxed{L(a,y)}$
W_2
b
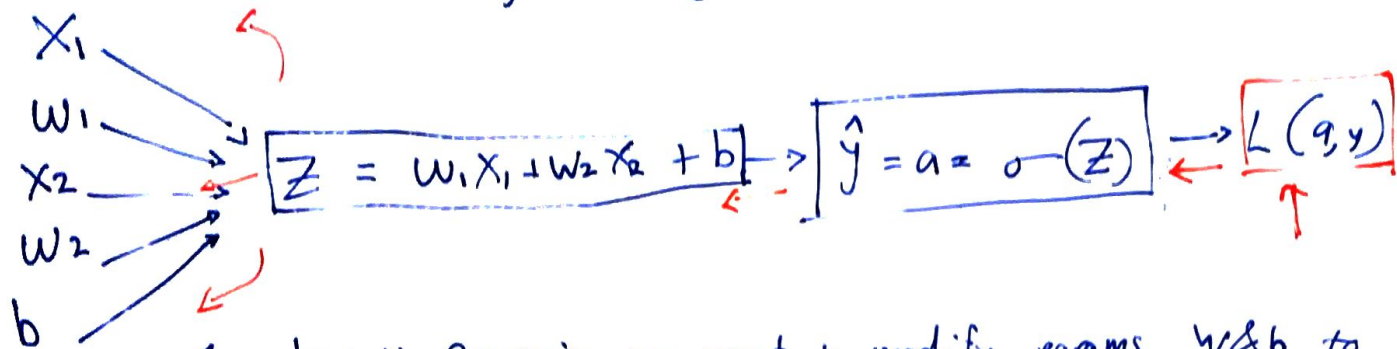
In logistic Regression, we want to modify params w & b to reduce the <u>loss</u>

How you actually compute the loss on a single training eg,
we want to compute derivatives wrt this loss

1) go backward to compute derivative of loss wrt a

"da" $= \dfrac{dL(a,y)}{da}$

$$\boxed{= -\dfrac{y}{a} + \dfrac{1-y}{1-a}}$$

$$\boxed{dz = \dfrac{dL}{dz} = \dfrac{dL(a,y)}{dz} \\ = a - y \\ = \dfrac{dL}{da} \cdot \dfrac{da}{dz}} \rightarrow a(1-a)$$

$\dfrac{dL}{dw_1} = "dw_1" = x_1 \cdot dz$; $dw_2 = x_2 \cdot dz$; $db = dz$

$w_1 := w_1 - \alpha dw_1$ $w_2 := w_2 - \alpha dw_2$ $b := b - \alpha db$

formula for derivative of loss wrt z ? $a-y$

Note this explaination is for a single observation (assuming 2 features x_1, x_2)