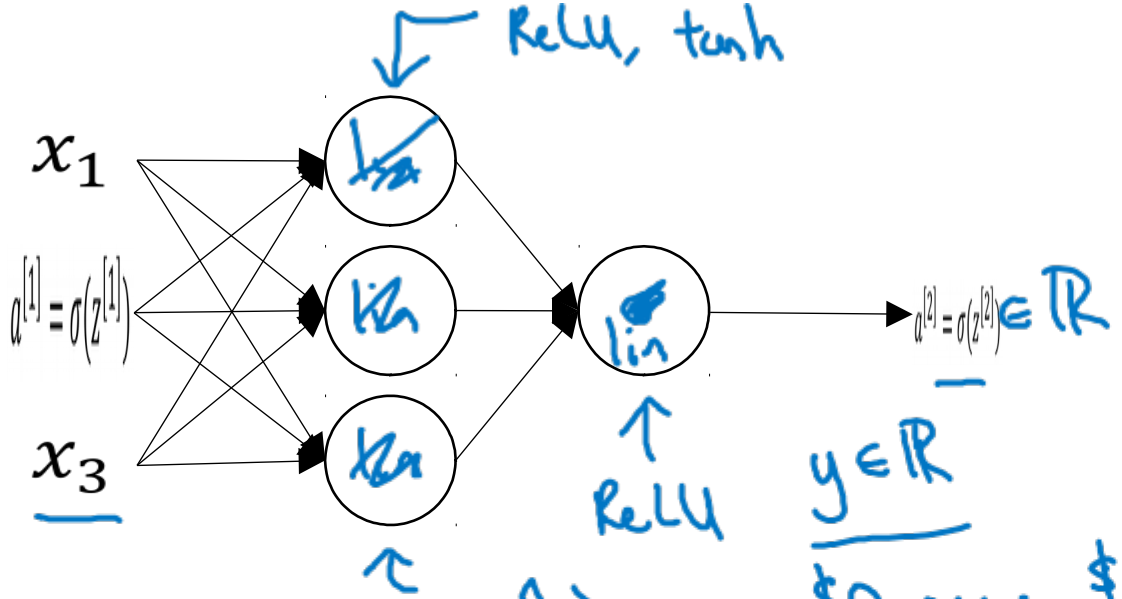
deeplearning.ai

One hidden layer Neural Network

Why do you need non-linear activation functions?

Activation function



$y \in \mathbb{R}$

$\$0 \ldots \$1{,}000{,}000$s

$\hat{y} \geq 0$.

$a^{[1]} = z^{[1]} = W^{[1]}x + b^{[1]}$

$a^{[2]} = z^{[2]} = W^{[2]}a^{[1]} + b^{[2]}$

$a^{[2]} = W^{[2]}(W^{[1]}x + b^{[1]}) + b^{[2]}$

$= (W^{[2]}W^{[1]})x + (W^{[2]}b^{[1]} + b^{[2]})$

$= W'x + b'$

Given x:

$$\begin{cases} z^{[1]} = W^{[1]}x + b^{[1]} \\ a^{[1]} = g^{[1]}(z^{[1]}) \end{cases}$$

$$z^{[2]} = W^{[2]}a^{[1]} + b^{[2]}$$

$$a^{[2]} = g^{[2]}(z^{[2]})$$

$g(z) = z$

"linear activation function"

$g(z) = z$