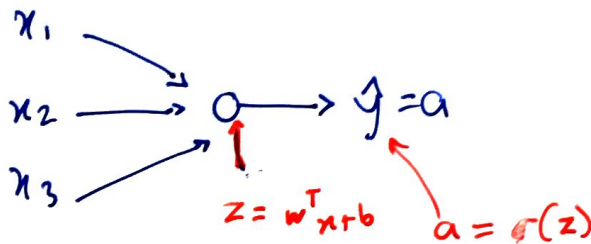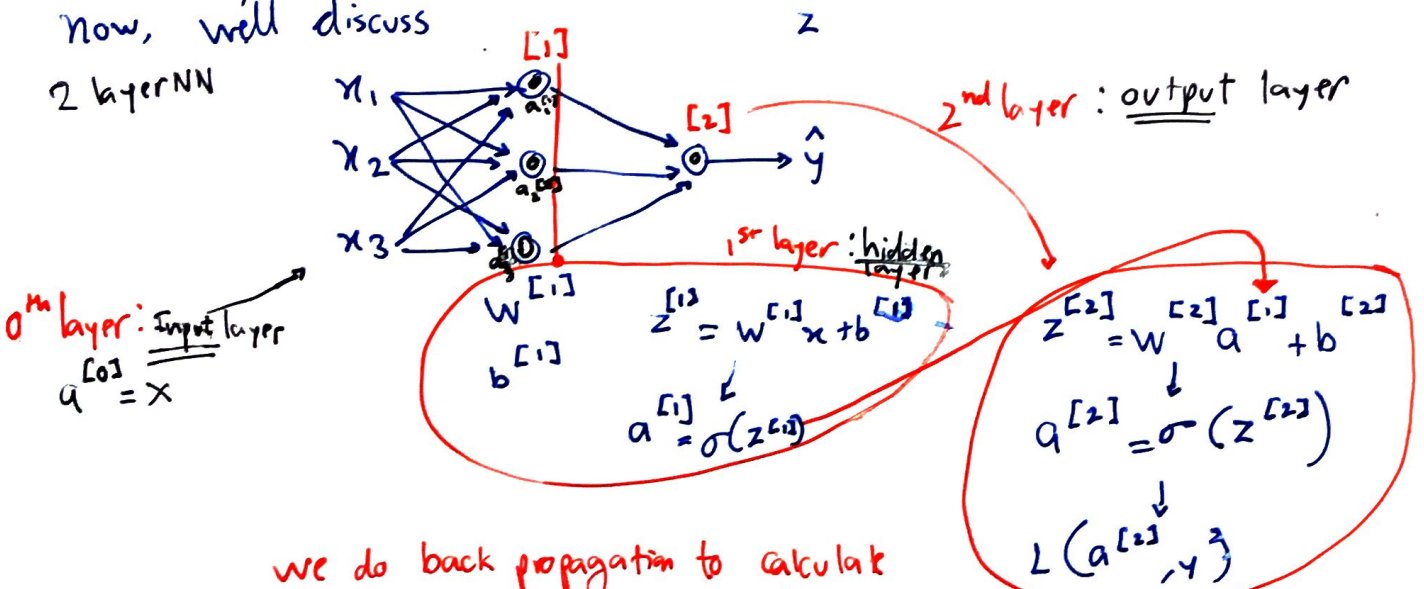# Neural Networks:

- Neural Networks are a set of algorithms, modeled loosely after a human brain, that are designed to recognize patterns.
- helps us cluster & classify.

previously, we saw:

$$z = w^T x + b \qquad a = \sigma(z)$$

now, we'll discuss
2 layer NN

z

[1] [2]

2nd layer : <u>output layer</u>

1st layer : <u>hidden layer</u>

0th layer : <u>Input layer</u>
$$a^{[0]} = X$$

$W^{[1]}$
$b^{[1]}$

$$z^{[1]} = w^{[1]} x + b^{[1]}$$
$$a^{[1]} = \sigma(z^{[1]})$$

$$z^{[2]} = w^{[2]} a^{[1]} + b^{[2]}$$
$$a^{[2]} = \sigma(z^{[2]})$$
$$L(a^{[2]}, y)$$

we do back propagation to calculate
$$d a^{[2]} \longrightarrow dz^{[2]} \longrightarrow d w^{[1]}, db^{[2]} \& \text{ so on}$$

R→L Back calculation

- NN → basically take a logistic regression & repeat it twice.

Notation
$$a_1^{[1]} \longrightarrow 1^{st} \text{ layer, } 1^{st} \text{ weight}$$
$$a_2^{[1]} \longrightarrow 1^{st} \text{ layer, } 2^{nd} \text{ weight}$$