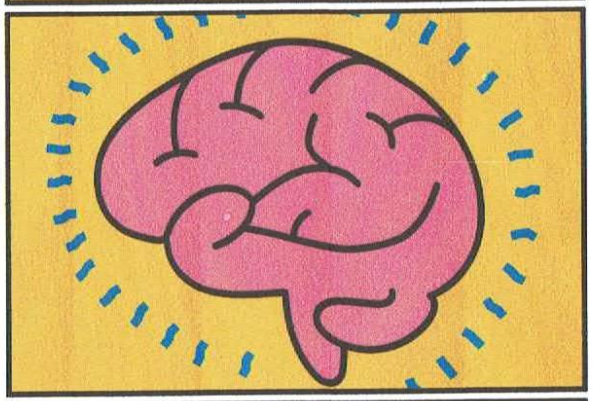
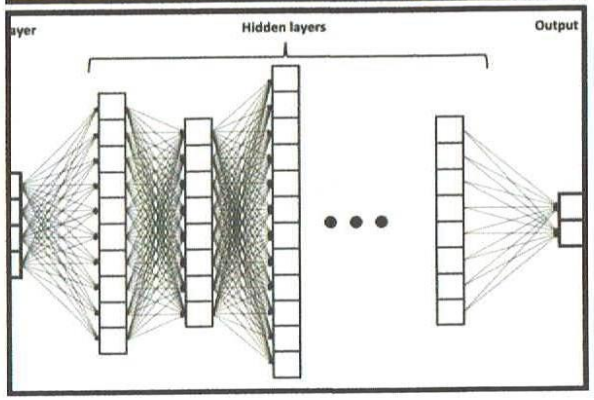
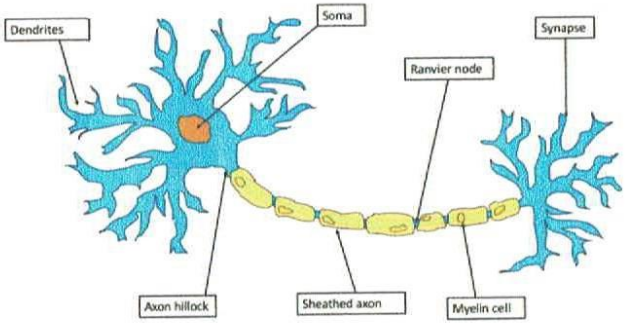
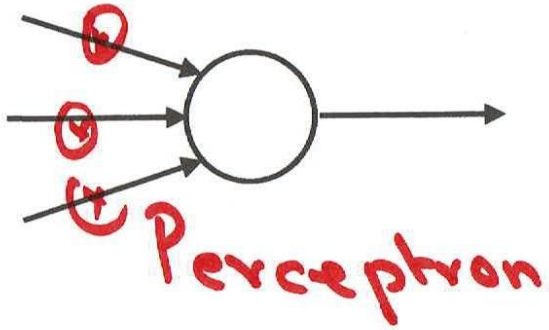
Building towards a complex task!

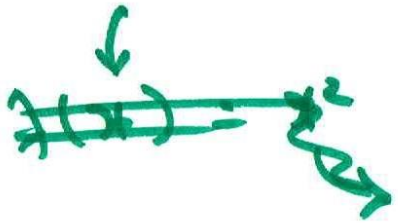






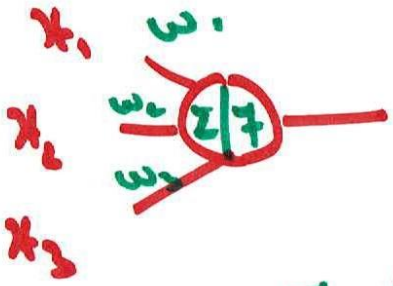


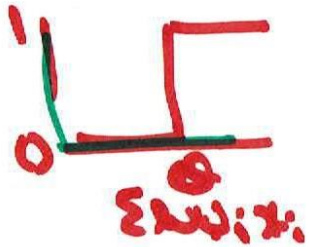
Perceptron!



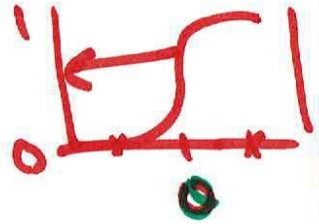
- What does it do?

1958

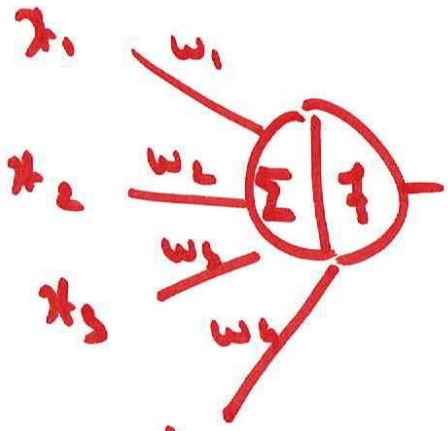




$$\text{Output} = \begin{cases} 1 & \text{if } \sum w_i x_i \\ 0 & \end{cases}$$



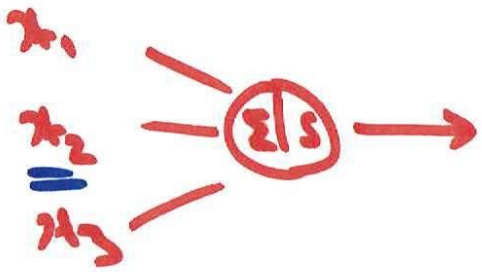
- Bias



$$f\left(\sum w_i x_i + w_4\right)$$

1

Perceptron

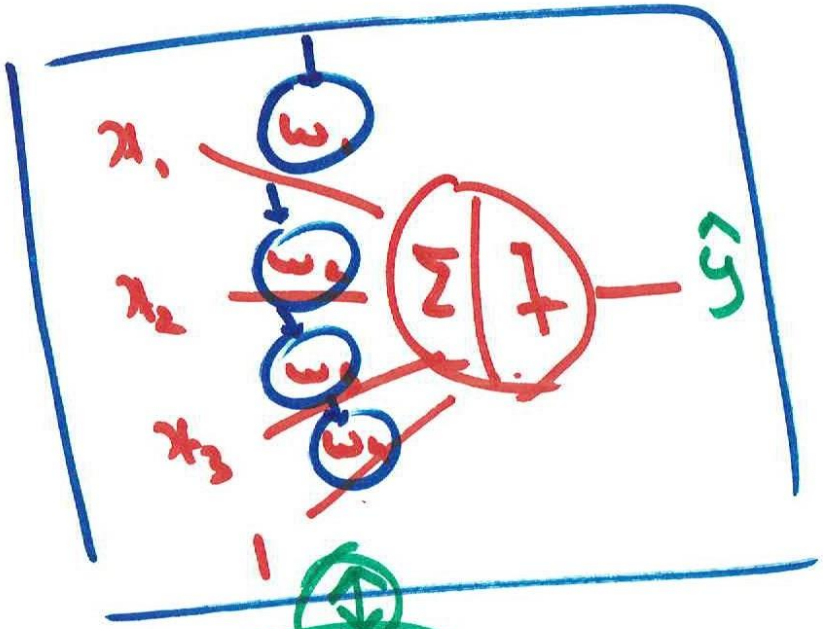


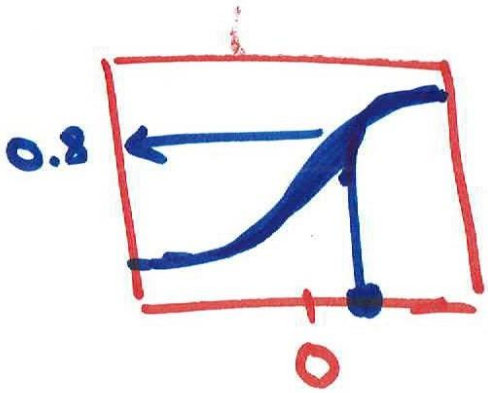
if $\sum x_i \geq \Theta \Rightarrow 1$

if $\sum x_i < \Theta \Rightarrow 0$

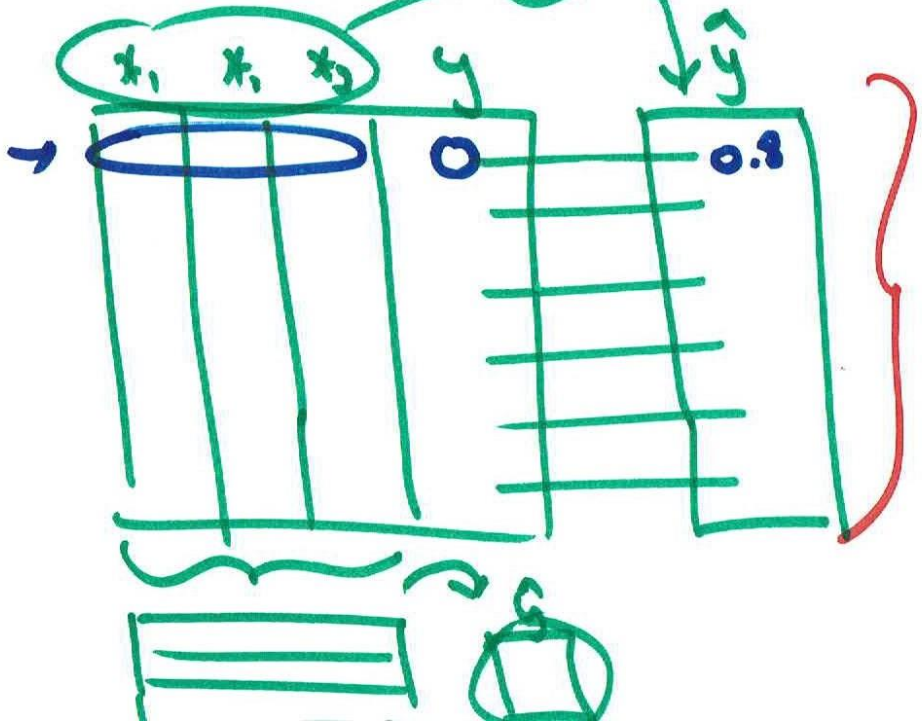
$\Theta = 1 \Rightarrow$ "OR"

$\Theta = 3 \Rightarrow$ "AND"





$$f\left(\sum w_i x_i + w_4\right)$$



An Example

MNIST

5 0 4 1 9 2 1 3 1 4

60000 train

28 × 28

5

0

4

9

784 → 64 → 10

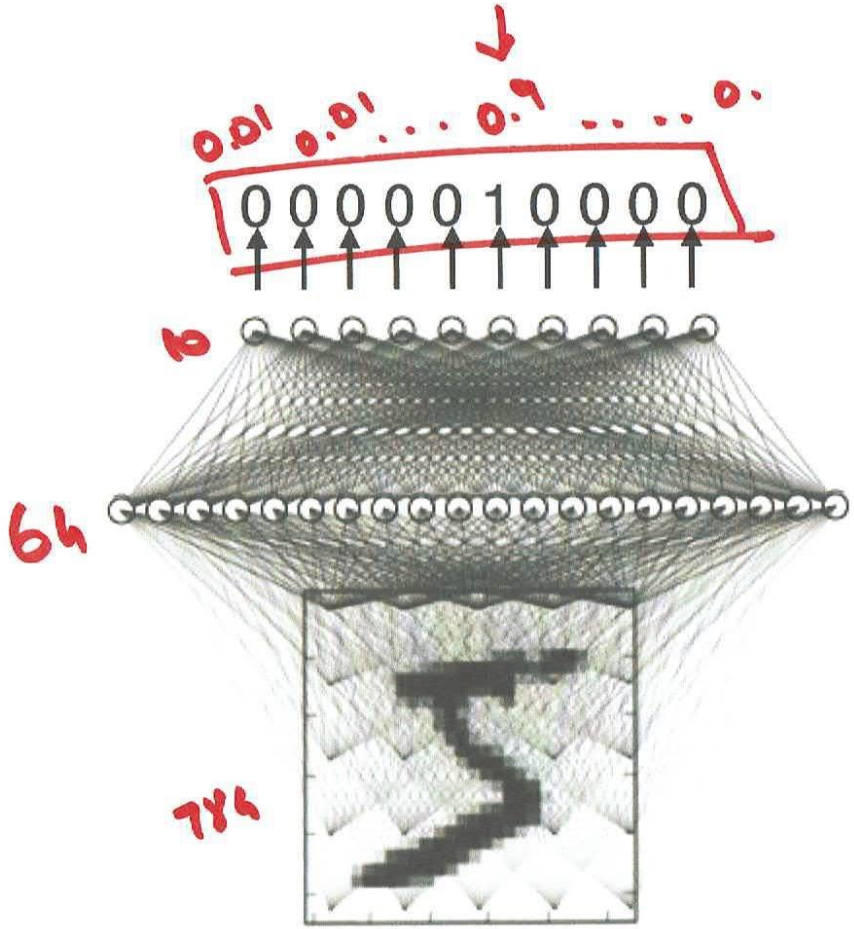
89%

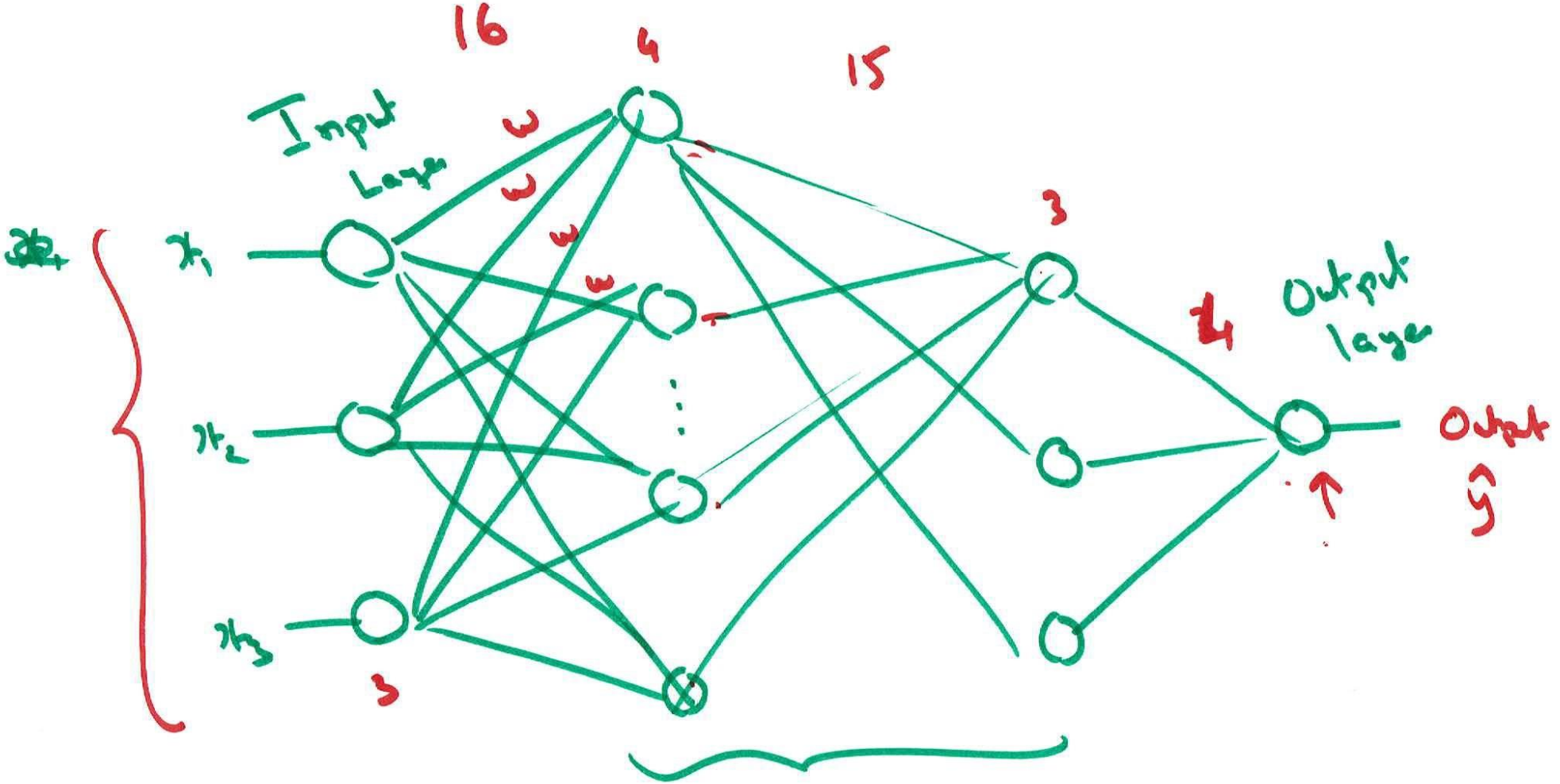
0.1 0.3 0.01 0.01 0.2

(784 × 64 + 64) + (64 × 10 + 10)

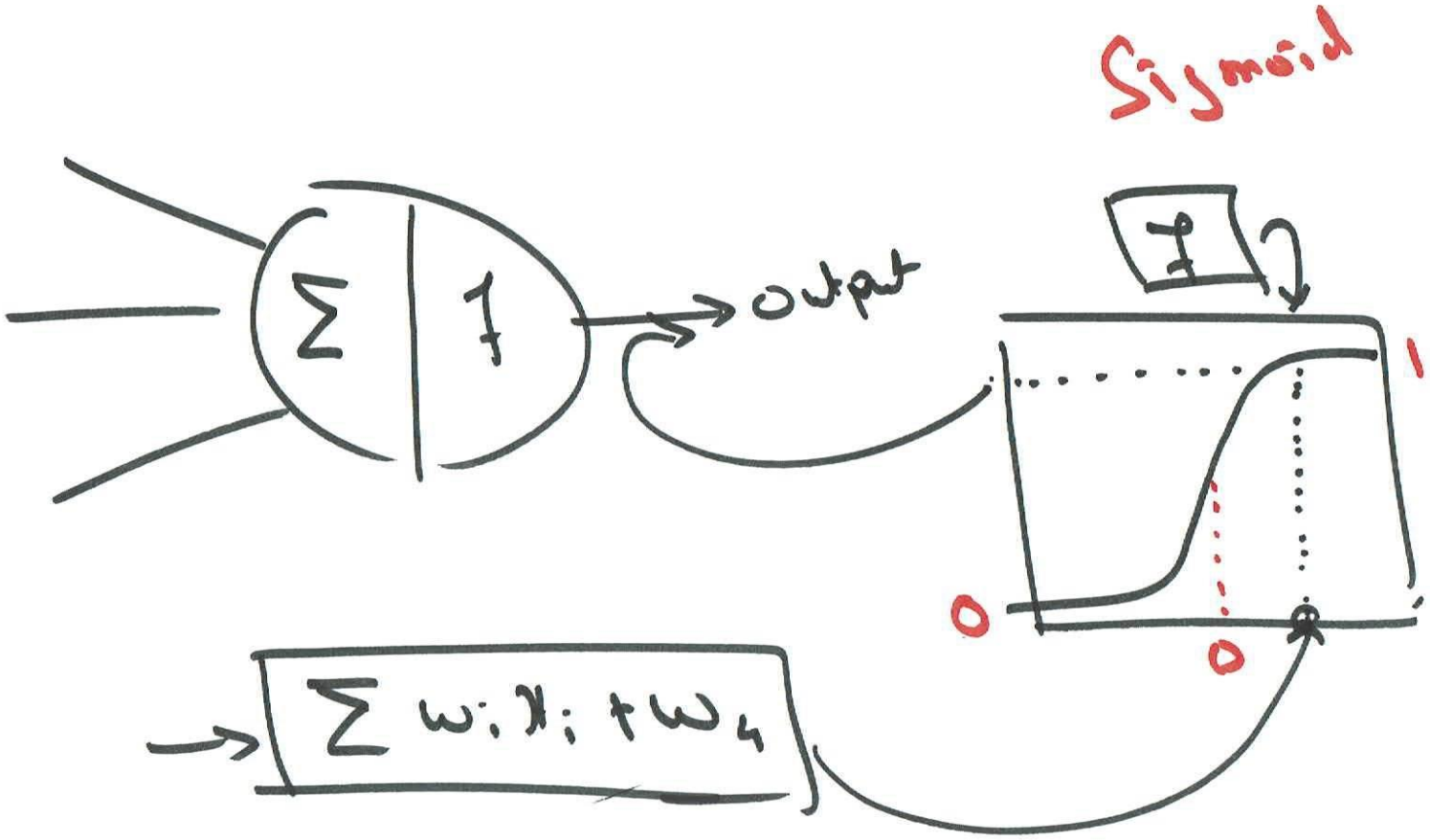
= 50890

An Example

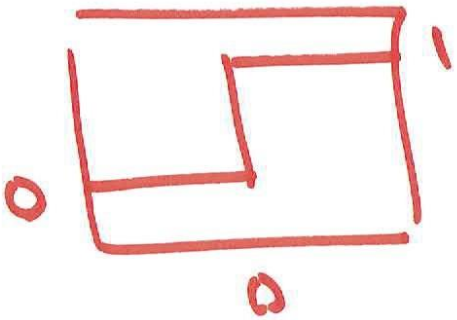




$$y = f\left(\sum w_i x_i + w_0\right)$$



Step



$$output = f\left(\sum w_i x_i + w_4\right)$$