Artificial Neuron

Neural Network

Inputs

x_1

w_1

x_2

w_2

w_3

x_3

bias
b

Σ
$f(\cdot)$
$\Sigma w_i x_i + b$

Activation Function

$\hat{y}$
out

Output

Input
Layer

Hidden
Layer 1

Hidden
Layer 2

Output
Layer

x_1

x_2

x_3

x_4

σ

σ

σ

σ

σ

σ

σ

σ

σ

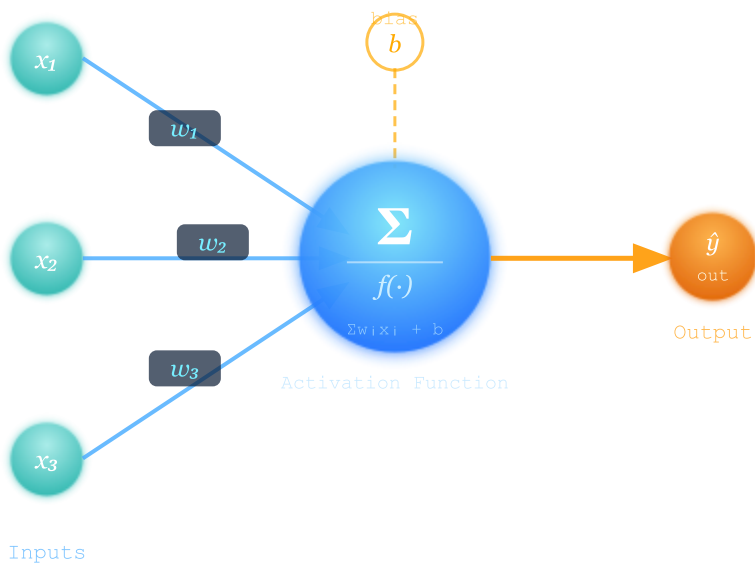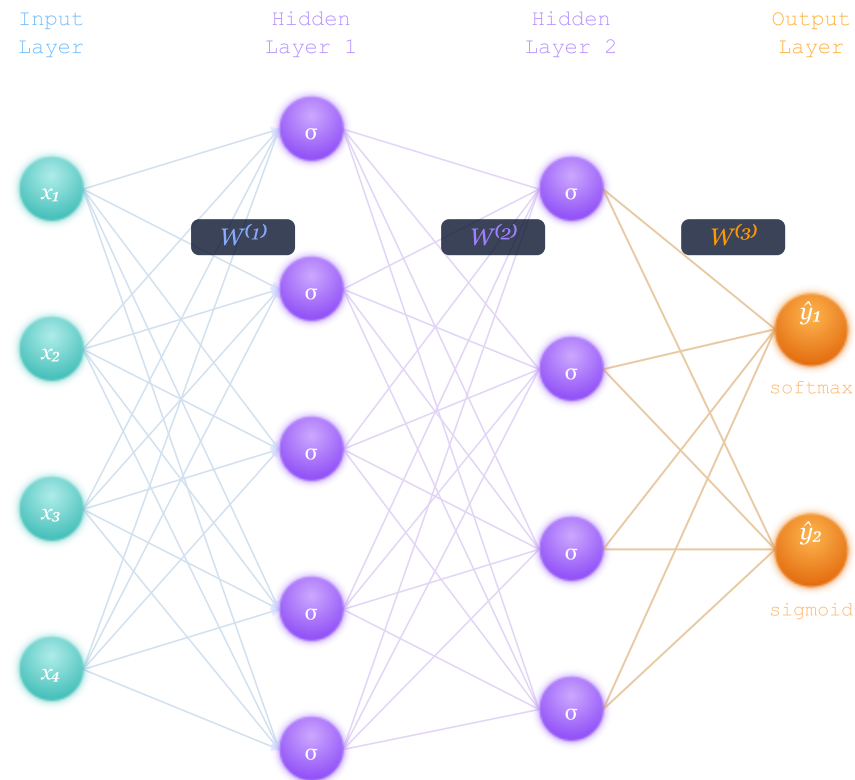$W^{(1)}$

$W^{(2)}$

$W^{(3)}$

$\hat{y}_1$
softmax

$\hat{y}_2$
sigmoid

Weighted sum: $z = w_1 x_1 + w_2 x_2 + w_3 x_3 + b$

Activation: $\hat{y} = f(z)$ e.g. sigmoid, ReLU, tanh

$f(z) = 1/(1+e^{-z})$ or $f(z) = \max(0, z)$

Each node = one artificial neuron $(\Sigma + f(\cdot))$

Layers stacked: input → hidden(s) → output

Training: backpropagation adjusts weights W

[Generated by Claude Sonnet 4.6]