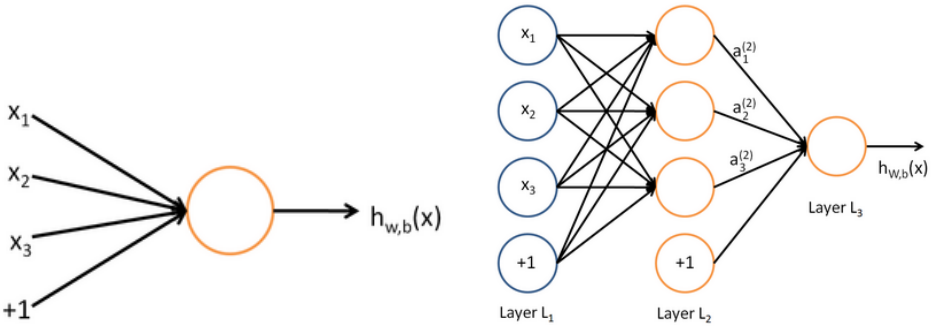
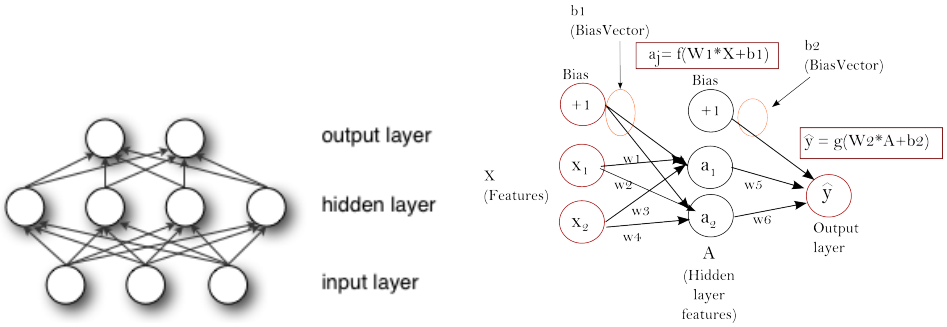
$\sigma p w_i$

$$h_{w,b}(x) = \sigma(w^T x) = \sigma\left(\sum_{i=1}^{p} w_i x_i + b\right)$$

w, b



$$(x_1, x_2, x_3)(3, 3, 1)$$



$\sigma b W \theta = (W, b) x d d$

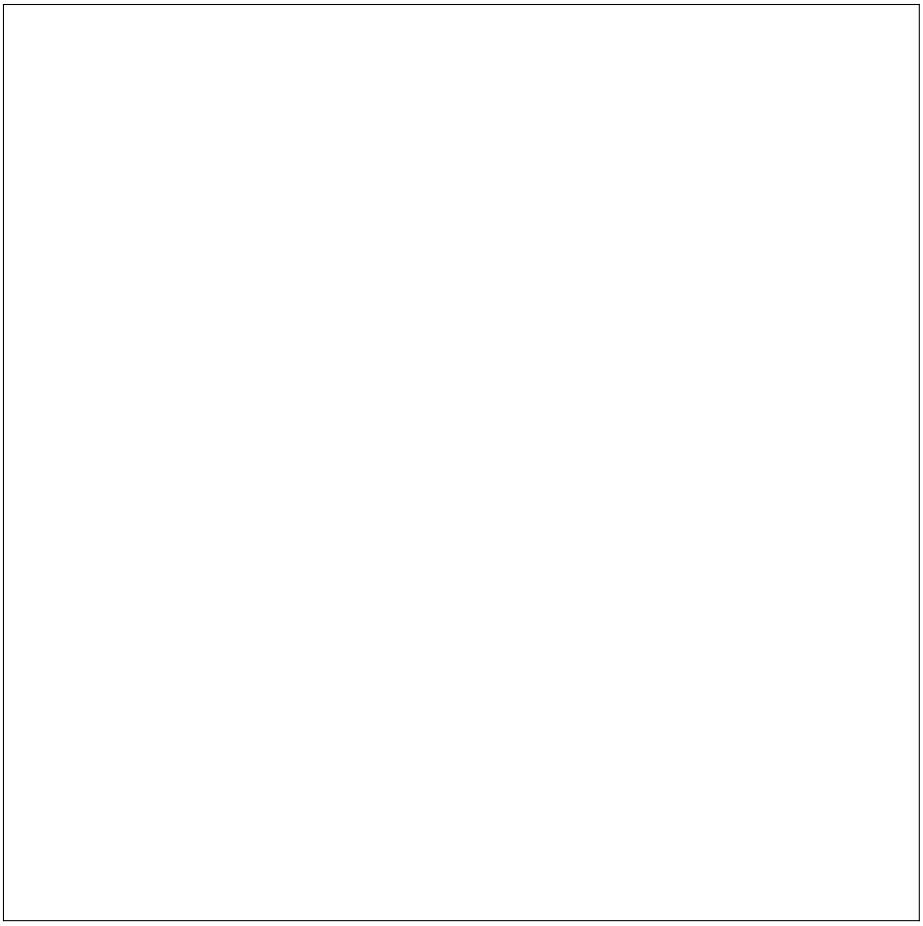
$$s(x) = \sigma(Wx + b)$$

$md = 3m = 4$

$\theta = (W_1, \cdots, W_p, b_1, \cdots, b_p) p$

v

vh



(v, h)

$$E(v, h; \theta) = -v^T W h - \frac{1}{2} v^T L v - \frac{1}{2} h^T J h$$

$(v, h)v$

$$p(v; \theta) = \frac{1}{\mathcal{Z}} \sum_h e^{-E(v,h;\theta)}$$

$\mathcal{Z} = \sum_{x,h} e^{-E(v,h;\theta)} \log p(v)$

$$\begin{aligned} p(h|v) &= \prod_i p(h_i|x) \\ p(v|h) &= \prod_j p(x_j|h) \end{aligned}$$

$$
\begin{aligned}
p(h_i = 1|v) &= \sigma\left(\sum_j W_{ji} x_j + d_i\right) \\
p(x_j = 1|h) &= \sigma\left(\sum_i W_{ji} h_i + b_j\right)
\end{aligned}
$$

$\sigma(b, d)$