ACHYUT.M.S
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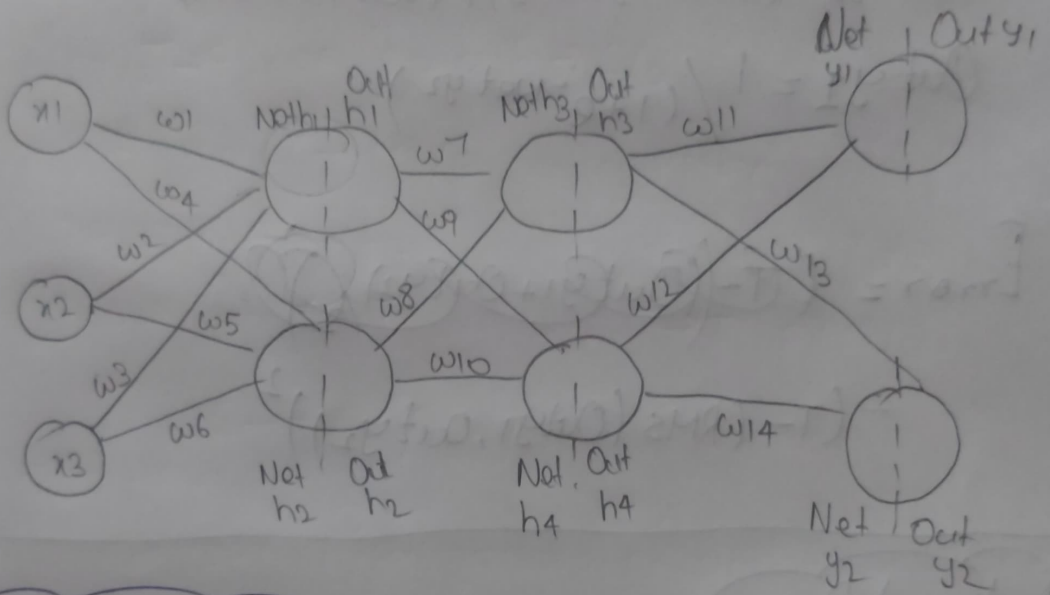# ASSIGNMENT 3 - Derivation of forward Pass and Backward Pass - 3 Inputs, 2 Nodes each in 2 Hidden layers, 2 Nodes in Output layer.

Forward Pass:

$$Net\, h_1 = (x_1 * w_1) + (x_2 * w_2) + (x_3 * w_3)$$

$$Out\, h_1 = 1/(1 + e^{-Net\, h_1})$$

$$Net\, h_2 = (x_1 * w_4) * (x_2 * w_5) + (x_3 * w_6)$$

$$Out\, h_2 = 1/(1 + e^{-Net\, h_2})$$

$$Net\, h_3 = (Out\, h_1 * w_7) + (Out\, h_2 * w_8)$$

$$Out\, h_3 = 1/(1 + e^{-Net\, h_3})$$

$$Net\, h_4 = (Out\, h_1 * w_9) + (Out\, h_2 * w_{10})$$

$$Out\, h_4 = 1/(1 + e^{-Net\, h_4})$$

Net $y_1 = (Out\ h_3 * w_{11}) + (Out\ h_4 * w_{12})$

Out $y_1 = 1 / (1 + e^{-Net\ y_1})$

Net $y_2 = (Out\ h_3 * w_{13}) + (Out\ h_4 * w_{14})$

Out $y_1 = 1 / (1 + e^{-Net\ y_2})$

Error $= (T - (Out\ y_1 + Out\ y_2))^2$

$= (T - (RMS\ (Out\ y_1, Out\ y_2))^2$

Backward Pass:

$w_1\ new = w_1\ old + 0.5 * \left(\dfrac{\partial Error}{\partial w_1} \right)$.

$w_2\ new = w_2\ old + 0.5 * \left(\dfrac{\partial Error}{\partial w_2} \right)$

$w_3\ new = w_3\ old + 0.5 * \left(\dfrac{\partial Error}{\partial w_3} \right)$.

$\vdots$

Soon for all weights

Forward Pass:

$$Net\ h_1 = (x_1 * w_1\ new) + (x_2 * w_2\ new) + (x_3 * w_3\ new)$$

$$Out\ h_1 = \frac{1}{(1 + e^{-Net\ h_1})}$$

$$\vdots$$

$$Error = \left(T - (RMS(Out y_1, Out y_2))\right)^2$$