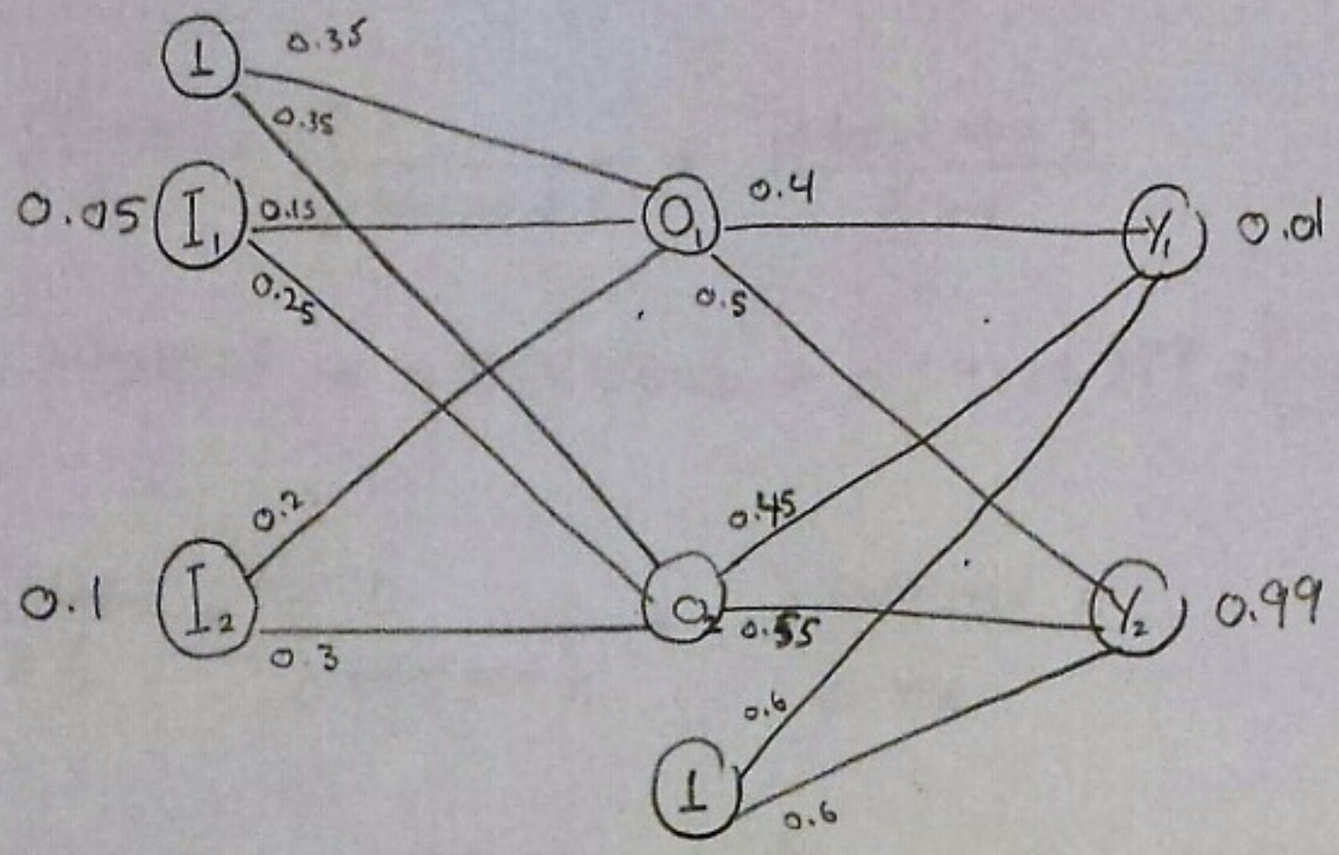

$I \rightarrow O$

total input $O_1 = (0.15)(0.05) + (0.2)(0.1) + (0.35)(1) = 0.3775$

total input $O_2 = (0.35)(1) + (0.25)(0.05) + (0.3)(0.1) = 0.3925$

$$O_1 = \frac{1}{1+e^{-0.3775}} = 0.59326999$$

$$O_2 = \frac{1}{1+e^{-0.3925}} = 0.59688437 8$$

$O \rightarrow Y$

total input $Y_1 = (0.4)(0.59326999) + (0.45)(0.596884378) + 0.6 = 1.105905966$

total input $Y_2 = (0.5)(0.59326999) + (0.55)(0.596884378) + 0.6 = 1.224921403$

$$Y_1 = 0.751365069$$

$$Y_2 = 0.772928465$$

$$E_{Y_1} = \frac{1}{2}(0.01 - 0.751365069)^2 = 0.274811083$$

$$E_{Y_2} = \frac{1}{2}(0.99 - 0.772928465)^2 = 0.023560025$$

$$\boxed{E_{total} = 0.298371108}$$

Output Layer
Pass_1

$$\frac{\partial E_{total}}{\partial w_5} = \frac{\partial E_{total}}{\partial Y_1} * \frac{\partial Y_1}{\partial \text{total input } Y_1} * \frac{\partial \text{total input } Y_1}{\partial w_5}$$

$$= 0.74136507 * 0.186815602 * 0.59326999 = \boxed{0.082167041}$$

$$\frac{\partial E_{total}}{\partial w_6} = \frac{\partial E_{total}}{\partial Y_1} * \frac{\partial Y_1}{\partial \text{total input } Y_1} * \frac{\partial \text{total input } Y_1}{\partial w_6}$$

$$= 0.74136507 * 0.186815602 * O_2 = 0.138498561 * 0.596884378$$

$$= \boxed{0.082667627}$$

$$\frac{\partial E_{total}}{\partial w_7} = \frac{\partial E_{total}}{\partial Y_2} * \frac{\partial Y_2}{\partial \text{total input } Y_2} * \frac{\partial \text{total input } Y_2}{\partial w_7}$$

$$= -(\text{target}_{Y_2} - Y_2) * Y_2(1-Y_2) * O_1$$

$$= -0.217071535 * 0.175447938 * 0.59326999 = \boxed{0.022598859}$$

$$\frac{\partial E_{total}}{\partial w_8} = \frac{\partial E_{total}}{\partial Y_2} * \frac{\partial Y_2}{\partial \text{total input } Y_2} * \frac{\partial \text{total input } Y_2}{\partial w_8}$$

$$= -0.217071535 * 0.175447938 * 0.596884378 = \boxed{-0.022736268}$$

$$w_5^+ = 0.4 - (0.5)(0.082167041) = \boxed{0.358916479}$$

$$w_6^+ = 0.45 - (0.5)(0.082667627) = \boxed{0.408666186}$$

$$w_7^+ = 0.5 - (0.5)(-0.022598859) = \boxed{0.511299295}$$

$$w_8^+ = 0.55 - (0.5)(-0.022736268) = \boxed{0.561368134}$$

$$\frac{\partial E_{total}}{\partial b_2} = \frac{\partial E_{\text{total input}}}{\partial Y_1} * \frac{\partial Y_1}{\partial \text{total input } Y_1} * 1 = \boxed{0.138498561} \Rightarrow b_2^+ = \boxed{0.53075}$$

$$\frac{\partial E_{total}}{\partial b_4} = \frac{\partial E_{total}}{\partial Y_2} * \frac{\partial Y_2}{\partial \text{total input } Y_2} * 1 = \boxed{0.038091578} \Rightarrow b_4^+ = \boxed{0.58095}$$

Hidden Layer 1.

Pass - 1

W_1:

$$\frac{\partial E_{total}}{\partial w_1} = \frac{\partial E_{total}}{\partial o_1} * \frac{\partial o_1}{\partial \text{total input } o_1} * \frac{\partial \text{total input } o_1}{\partial w_1}$$

($\frac{\partial o_1}{\partial \text{total input } o_1} = o_1(1-o_1)$; $\frac{\partial \text{total input } o_1}{\partial w_1} = I_1$)

$$= \left(\frac{\partial E_{y_1}}{\partial o_1} + \frac{\partial E_{y_2}}{\partial o_1}\right) * \frac{\partial o_1}{\partial \text{total input } o_1} * \frac{\partial \text{total input } o_1}{\partial w_1}$$

$$\left(\frac{\partial E_{y_1}}{\partial \text{total input } y_1} * \frac{\partial \text{total input } y_1}{\partial o_1} + \frac{\partial E_{y_2}}{\partial \text{total input } y_2} * \frac{\partial \text{total input } y_2}{\partial o_1}\right)$$

($w_5 = 0.4$; $w_7 = 0.5$)

$$\frac{\partial E_{y_1}}{\partial y_1} * \frac{\partial y_1}{\partial \text{total input } y_1} \qquad \frac{\partial E_{y_2}}{\partial y_2} * \frac{\partial y_2}{\partial \text{total input } y_2}$$

$-0.217071535 * 0.175477938 = -0.038091578$

$0.74136507 * 0.186815602 = 0.138498561$

$\frac{\partial E_{total}}{\partial o_1} = 0.055399424 + -0.019045789 = \boxed{0.036353635}$

$\frac{\partial E_{total}}{\partial w_1} = 0.036353635 * 0.241300709 * 0.05 = \boxed{0.000043807}$

$w_1^+ = 0.15 - 0.5(0.000043807) = \boxed{0.149780696}$

W_2:

$$\frac{\partial E_{total}}{\partial w_2} = \frac{\partial E_{total}}{\partial o_1} * \frac{\partial o_1}{\partial \text{total input } o_1} * \frac{\partial \text{total input } o_1}{\partial w_2}$$

$= 0.055399424 * 0.241300709 * 0.1 = \boxed{0.001336792029}$

$w_2^+ = 0.2 - 0.5(0.001336792029) = \boxed{0.199331604}$

W_3:

$$\frac{\partial E_{total}}{\partial w_3} = \frac{\partial E_{total}}{\partial O_2} * \frac{\partial O_2}{\partial \text{total input } O_2} * \frac{\partial \text{total input } O_2}{\partial w_3}$$

($\frac{\partial O_2}{\partial \text{total input } O_2} = O_2(1-O_2)$)

$$\frac{\partial E_{Y_1}}{\partial O_2} = \frac{\partial E_{Y_1}}{\partial \text{total input } Y_1} * \frac{\partial \text{total input } Y_1}{\partial O_2}$$

$$= \frac{\partial E_{Y_1}}{\partial Y_1} * \frac{\partial Y_1}{\partial \text{total input } Y_1} * 0.45 = \boxed{0.062324352}$$

$$\frac{\partial E Y_2}{\partial O_2} = \frac{\partial E Y_2}{\partial \text{total input } Y_2} * \frac{\partial \text{total input } Y_2}{\partial O_2}$$

$$= \frac{\partial E_{Y_2}}{\partial Y_2} * \frac{\partial Y_2}{\partial \text{total input } Y_2} * 0.55 = \boxed{-0.020950367}$$

$$\frac{\partial E_{total}}{\partial O_2} = \boxed{0.041373984}$$

$$\Rightarrow \frac{\partial E_{total}}{\partial w_3} = 0.041373984 * 0.240613417 * 0.05 = \boxed{0.000049775678 39}$$

$$w_3^+ = 0.25 - 0.5(0.000049775678 39) = \boxed{0.249751121}$$

W_4:

$$\frac{\partial E_{total}}{\partial w_4} = \frac{\partial E_{total}}{\partial O_2} * \frac{\partial O_2}{\partial \text{total input } O_2} * \frac{\partial \text{total input } O_2}{\partial w_4} = \boxed{0.000995513566 5}$$

$$w_4^+ = 0.3 - 0.5(0.000995513566 5) = \boxed{0.29950224 3}$$

b_1: $\frac{\partial E_{total}}{\partial b_1} = \frac{\partial E_{total}}{\partial O_1} * \frac{\partial O_1}{\partial \text{total input } O_1} * 1 = \boxed{0.00877214}$

$$b_1^+ = 0.35 - 0.5(0.00877214) = \boxed{0.34561393}$$

b_3: $\frac{\partial E_{total}}{\partial b_2} = \frac{\partial E_{total}}{\partial O_2} * \frac{\partial O_2}{\partial \text{total input } O_2} * 1 = 0.009955135665$

$b_3^+ = 0.35 - 0.5(0.009955135665) = \boxed{0.345022432}$

Forward pass. 2

I → O

total input $O_1 = b_1^+ .(1) + w_1^+ . I_1 + w_2^+ . I_2 = 0.373036125$

$O_1 = 0.59219240 9$

total input $O_2 = b_3^+ (1) + w_3^+ I_1 + w_4^+ . I_2 = 0.387460212$

$O_2 = 0.595671147$

O → Y

total input $Y_1 = O_1 . w_5^+ + O_2 . w_6^+ + b_2^+ = 0.986728989$

$Y_1 = \boxed{0.728441352}$

total input $Y_2 = O_1 . w_7^+ + O_2 . w_8^+ + b_4^+ = 1.218132573$

$Y_2 = \boxed{0.771734749}$

$E_{Y_1} = \frac{1}{2}(0.01 - 0.728441352)^2 = \boxed{0.258078988}$

$E_{Y_2} = \frac{1}{2}(0.99 - 0.771734749)^2 = \boxed{0.023819859}$

$E_{total} = \boxed{0.281898847}$