ASSIGNMENT 2 (INDIVIDUAL)
BACKPROPAGATION NEURAL NETWORK
ASSIGNED DATE: 13 APRIL 2021
DUE DATE: 28 APRIL 2021

Given the following network architecture for a NAND ("Not AND") logical operation. Assume that the learning rate α = 0.4, with inputs and weights as given in Table 1, while threshold θ and biases as shown in Figure 1 **[30 marks]**:

Epoch	Inputs		Desired Output	Initial Weights						Actual Output	Error	SSE	Updated Weights					
1	x_1	x_2	Y_d	w_{13}	w_{14}	w_{23}	w_{24}	w_{35}	w_{45}	Y	e	$\sum(e)^2$	w_{13}	w_{14}	w_{23}	w_{24}	w_{35}	w_{45}
	0	1	1	1.1	0.8	0.5	0.8	0.9	-1.3	?	?	?	?	?	?	?	?	?

Table 1

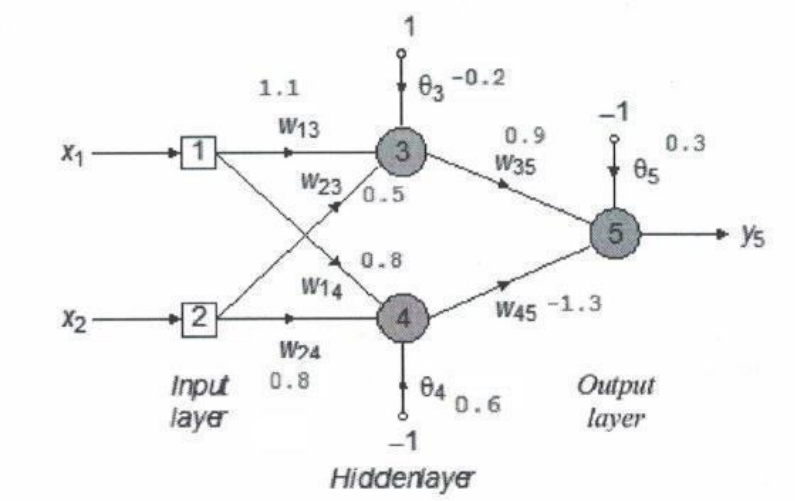

Figure 1

a. Calculate the output $y_j(p)$ at neuron 3, 4 and 5. Subsequently, calculate the error e. (8 marks)

b. Calculate the error gradients $\delta_5(p)$ at the output layer (neuron 5) and the error gradients $\delta_3(p)$ and $\delta_4(p)$ at the hidden layer (neuron 3 and neuron 4). (8 marks)

c. Determine the weight corrections $\Delta w_{ij}(p)$ and $\Delta\theta_j(p)$. (7 marks)

d. Update all weights and threshold accordingly. (7 marks)