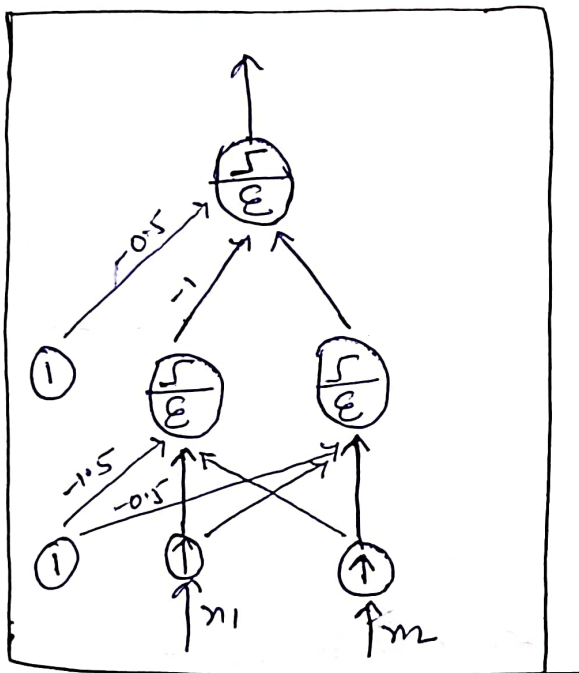


Multi-Layer Perceptron

→ single layer TLVs are incapable of solving trivial problems, such as XOR for example.

→ But, by stacking multiple perceptrons, it turns out that some of the limitations of perceptrons can be eliminated.

these type of stacking, is called multi-layer perceptron.



→ Now this stacked, multi-layer perceptron can solve the XOR Problem.

Input: (0,0) or (1,1)

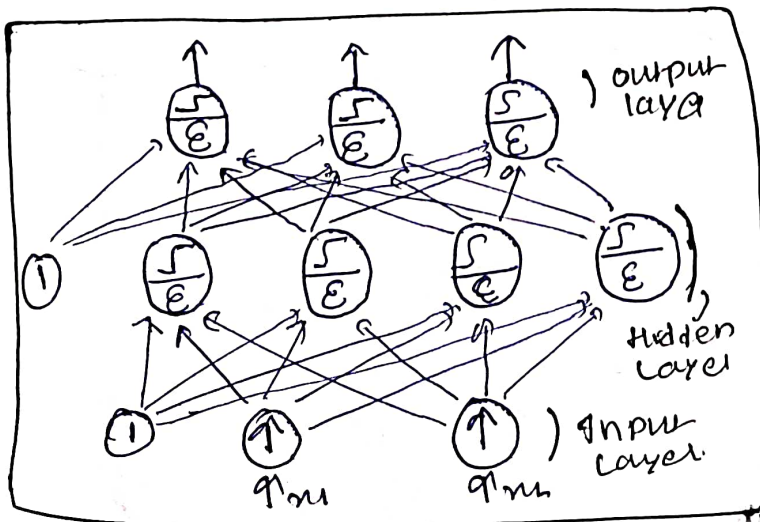
output: 0

Input: (0,1) or (1,0)

output: 1

Just as expected! ✓

→ An MLP is composed of one input layer (pass through), one or more layers of TLVs called hidden layers, and one final layer of TLV called output layer.



→ when an ANN contains a deep stack of hidden layers, then it is called deep neural network, and study of these DNN is called

Deep Learning ✱

→ Now, the question arises that,

① what is Hidden layer and why we need it?

→ we know that, in a neural network layers consist of neurons / perceptrons. And we have input layer which receives data and output layer which produces results.

→ And the layers in between these two are called the hidden layers.

→ we need these hidden layers, because they allow the algorithm to learn, generalize and recognize complex patterns.

① they extract hierarchical features for intricate pattern recognition.

② it enables us to handle the non-linear data.

③ prevents overfitting by learning essential patterns while avoiding memorization.

④ now that we understood the importance of hidden layers, then we can think that,

How many hidden layers should we add?

How many neurons in each hidden layer?

These will be unfolded as we move further into complex concepts of deep learning.

For now, focus is on multi-layer perceptron.