Assignment

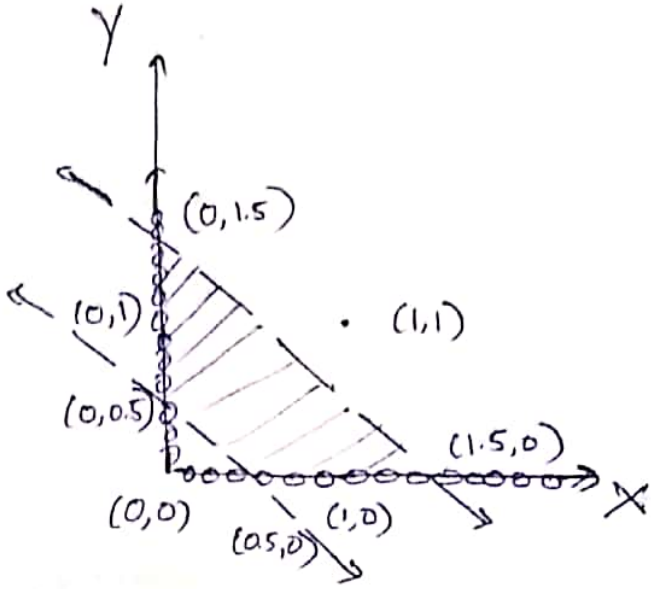
XOR operation (exclusive OR)

$Z = X \oplus Y = X\bar{Y} + \bar{X}Y$

Truth Table

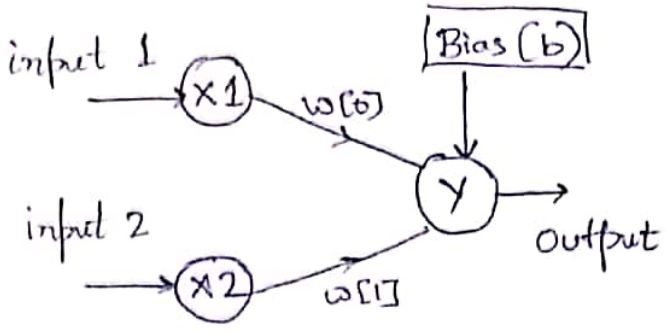
X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0

Decision planes



Neural Network:

Goal: Classify input patterns accoring to touth table given above



Neuron Architecture

Neuron Operation

1) Accept Inputs (X1, X2)

2) Activation function is weighted sum of inputs

$$Y = \sum_i w_i x_i + b \text{ (bias)}$$

3) Output has to be classified:

if $(0.5 < Y < 1.5)$: $Y = 1$

Else: $Y = 0$

Learning Algorithm

1) Initialize the weights and biases
2) Iterate over the data (epochs)
   i. Compute the output
   ii. Compute loss function

$$\Delta = \text{Desired Output} - \text{Actual output}$$

   iii. Update weight

$$W(\text{new}) = W(\text{old}) + \Delta * \text{learning rate} * x_i$$

   iv. Update learning Rate

$$\text{Rate} = \text{Rate} \pm (\text{learning bias})$$

3) Repeat the procedure unfill operation is realized