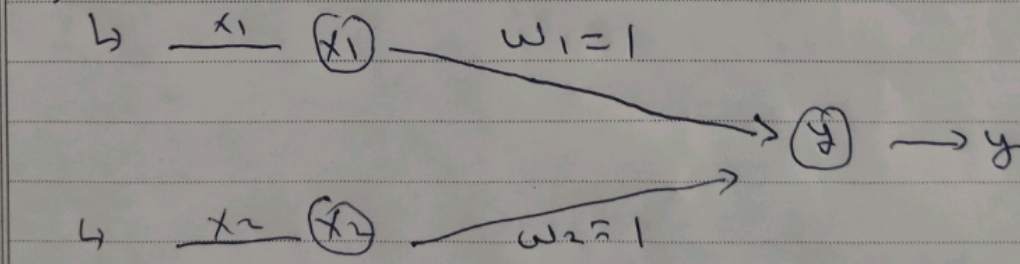
Q4) implement AND function using mc Culloh. Pitt's neuron?

Ans:-4) Truth table for AND function

x_1	x_2	Y
1	1	1
1	0	0
0	1	0
0	0	0

Since M-P neuron has no Particular training algorithm.

Hence, assume the wt = $w_1 = 1$ and ~~$w_2 = 1$~~ $w_2 = 1$



(1,1) $y_{in} = x_1 w_1 + x_2 w_2 = 1 \times 1 + 1 \times 1 = 2$ ✓
(1,0) $y_{in} = x_1 w_1 + x_2 w_2 = 1 \times 1 + 0 \times 1 = 1$
(0,1) $y_{in} = x_1 w_1 + x_2 w_2 = 0 \times 1 + 1 \times 1 = 1$
(0,0) $y_{in} = x_1 w_1 + x_2 w_2 = 0 \times 1 + 0 \times 1 = 0$

Threshold value is ~~not~~ equal to 2 ($\theta = 2$)

this can also be obtained by

$$\theta \geq nw - p$$

Here $n=2$ $w=1$, $p=0$.

$$\theta \geq 2 \times 1 - 0 \Rightarrow \theta \geq 2$$

thus the output neuron Y can be written as

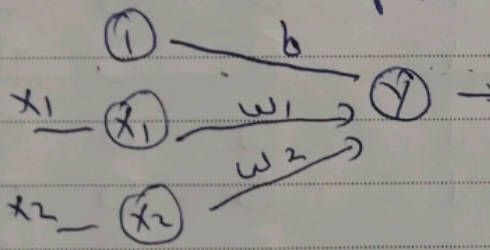
$$y = f(y_{in}) = \begin{cases} 1 & \text{if } y_{in} \geq 2 \\ 0 & \text{if } y_{in} < 2 \end{cases}$$

Q5) implement OR function with binary inputs and bipolar targets using Perceptron training algorithm?

Sol:- its OR function table

x_1	x_2	t
1	1	1
1	0	1
0	1	1
0	0	-1

Perceptron net for OR function.



the intial wt's for bias and wt are taken as.

$w_1 = w_2 = b = 0$.

Also the learning Rate 1 and threshold is 0.2 so the activation function becomes.

$$f(y_{in}) = \begin{cases} 1 & \text{if } y_{in} > 0.2 \\ 0 & \text{if } -0.2 \leq y_{in} \leq 0.2 \end{cases}$$

The network is trained as per the Perceptron training rule, for 3 epoch's.

input x_1	input x_2	input 1	target (t)	Net input (Yin)	Calculated output (Y)	weight changes Δw_1	Δw_2	Δb	weights w_1	w_2	b
									(0	0	0)
Epoch - 1											
1	1	1	1	0	0	1	1	1	1	1	1
1	0	1	1	2	1	0	0	0	1	1	1
0	1	1	1	2	1	0	0	0	1	1	0
0	0	1	-1	1	1	0	0	-1	1	1	0
Epoch - 2											
1	1	1	1	2	1	0	0	0	1	1	0
1	0	1	1	1	1	0	0	0	1	1	0
0	1	1	1	1	1	0	0	0	1	1	0
0	0	1	-1	0	0	0	0	0	1	1	-1
Epoch - 3											
1	1	1	1	1	1	0	0	0	1	1	-1
1	0	1	1	0	0	1	0	1	2	1	0
0	1	1	1	1	1	0	0	0	2	1	0
0	0	1	-1	0	0	0	0	-1	2	1	-1