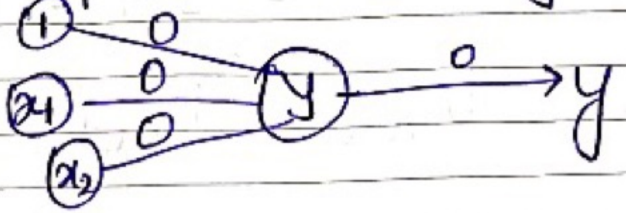
Implement AND function using perceptron network for bipolar input and target



i/p

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

Case 1: $x_1 = 1$ $x_2 = 1$ $t = 1$

$W_1(new) = W_1(old) + \alpha t x_1$

$= 0 + 1 \times (+1) \times 1$

$= 1$

$W_2(new) = 0 + 1.(+1).(1) = 1$

$b(new) = 0 + 1(1) = 1$

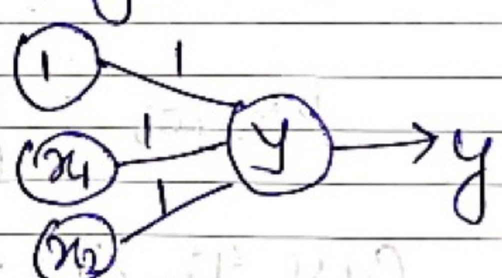
Case 2:

$X_1 = 1$ $X_2 = -1$ $t = -1$ $y_{in} = 1$

$y = f(y_{in})$

$y = 1$ $(\theta = 0)$

o/p should be -1



Hence Weight → update

$W_1(new) = W_1(old) + \alpha t x_1$

$= 1 + 1(-1)(1)$

$= 1 - 1 = 0$

$W_2(new) = W_2(old) + \alpha t x_2$

$= 1 + 1(-1)(-1)$

$= 2$

$b_{new} = b_{(old)} + \alpha(t) = 1 - 1 = 0$

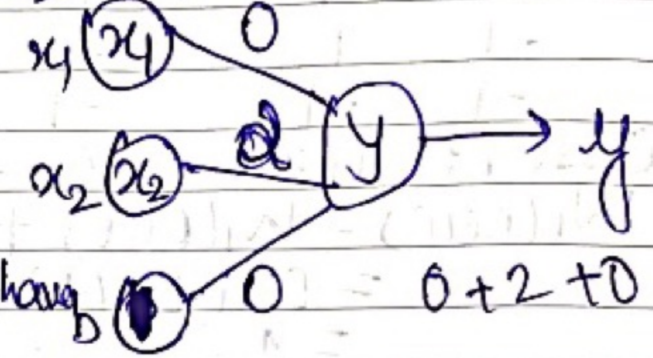
Case 3: $x_1 = -1$ $x_2 = +1$ $t = -1$

$y_{in} = 2$

$y = f(y_{in})$ $\theta = 0$

$y = 1$

(o/p should have be -1)



$0 + 2 + 0$

$W_1(new) = W_1(old) + \alpha t x_1$

$= 0 + 1(-1)(-1)$

$= 1$

$W_2(new) = 2 + (1).(+1)(-1)$

$= 2 - 1 = 1$

$b_{(new)} = b_{old} + \alpha t$

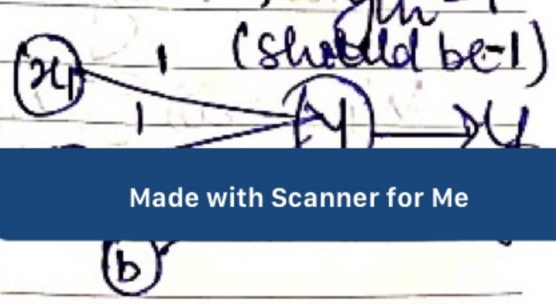
$= 0 + (-1)(1) = -1$

Case 4: $X_1 = -1$ $X_2 = -1$ $t = -1$ $y_{in} = 1$ (should be -1)

$W_1(new) = W(old) + \alpha t x_1$

$= +1 + (1)(-1)(-1)$

$= 2$



Made with Scanner for Me

$$W_{2(new)} = W_{2(old)} + \alpha t x_2$$

$$= 1 + (1)(-1)(-1)$$

$$= 2$$

$$b_{(new)} = b_{(old)} + \alpha t$$

$$= -1 + (1)(-1) = -2$$

V. S. Shravani

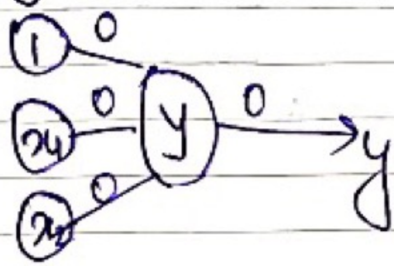
1707012 3120

G - 3 (2017-21)

Implement OR function using perceptron network for bipolar input and target.

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

i/p



$y_{in} = 0$ (should be -1)
$\alpha = 1$

Case 1: $x_1 = -1$; $x_2 = -1$; $t = -1$

$W_1(new) = W(old) + \alpha t x_1$
$= 0 + 1(-1)(-1)$
$= 1$

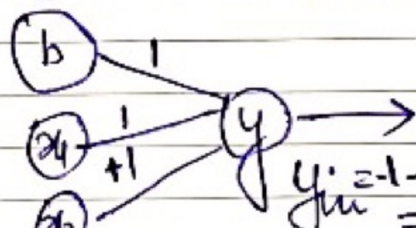
$W_2(new) = W(old) + \alpha t x_2$
$= 0 + 1 \cdot (-1) \cdot (-1)$
$= 1$

$b_{(new)} = b(old) + \alpha t$
$= 0 + (1)(-1) = -1$

$y_{in}(new) = -1 -1 -1$
$= -3 < \theta$
$\therefore y_{in} = -1$

Case 2: $x_1 = -1$ $x_2 = +1$ $t = 1$ $y_{in} = 0$ (should be +1)

$W_1(new) = W_{old} + \alpha t x_1$
$= 1 + (1)(1)(-1)$
$= 0$



$y_{in} = -1 -1 +1$
$= -1$
$< \theta$

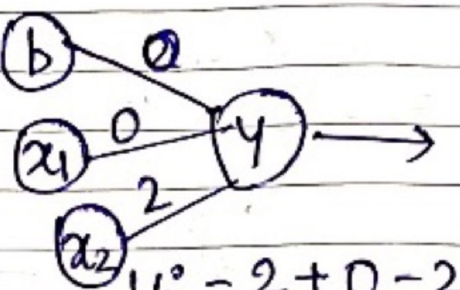
$\theta = 0$

$W_2(new) = W_{old} + \alpha t x_2$
$= 1 + (1)(1)(+1)$
$= 2$

$b_{new} = b_{old} + \alpha t$
$= -1 + (1)(1)$
$= 0$

$= 2 > \theta$ ($y_{in} = 1$)

Case3: $x_1 = 1 \quad x_2 = -1 \quad \cancel{B}\, t = 1$



$$w_{1\,new} = w_{1\,old} + \alpha t x_1$$
$$= 0 + (1)(1)(1)$$
$$= 1$$

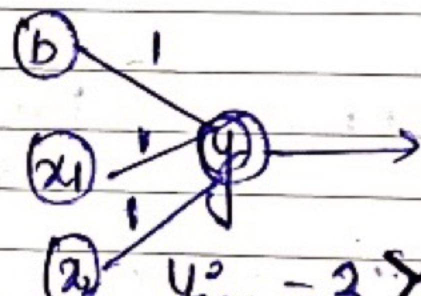
$$w_{2(new)} = w_{2\,old} + \alpha t x_2$$
$$= 2 + (1)(1)(-1)$$
$$= 1$$

$$b_{(new)} = b_{old} + \alpha t$$
$$= 0 + (1)(1)$$
$$= 1$$

$$y_{in} = 2 + 0 - 2$$
$$= 0 \leq \theta$$
$$\theta = 0$$
$$y_{in} = -1$$
(should be 1)

$$y_{in(new)} = 1 - 1 + 1$$
$$= 1 > \theta$$
$$\therefore y_{in} = 1$$

Case 4: $x_1 = 1 \quad x_2 = 1 \quad t = 1$



$\therefore y_{in} = t$

$\therefore$ no update ~~avaulat~~ required

$$y_{in} = 3 > \theta$$
$$y_{in} = 1$$