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Course - CSE 440
Faculty - SZZ

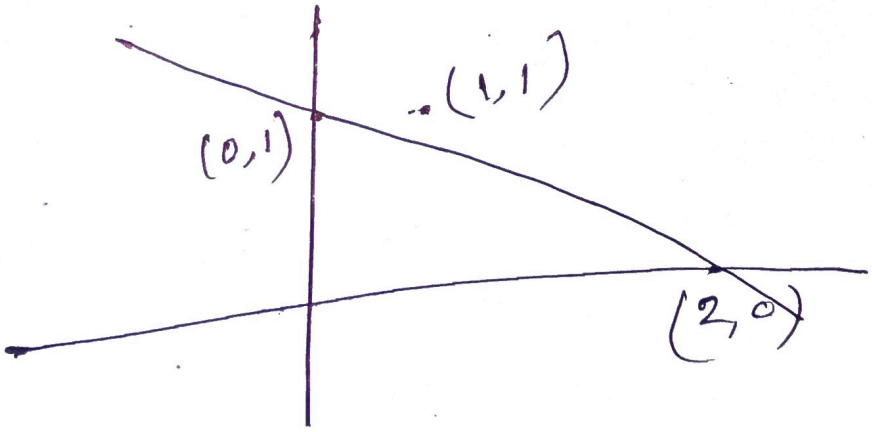
Quiz-05

Ans to the Qus NO-01

01.

1st step:

First I have to plot the data on a 2D graph. Then draw a line that separates the positive from the negative data point,



This line has slope $x_1 = -\frac{1}{2}$ and $x_2 = 5/4$ ∴ The x_1 slope intercept x_2, so the equation is,

$$x_2 = 5/4 - x_1\left(\frac{1}{2}\right)$$

$$\Rightarrow x_2 = 5/4 - \frac{x_1}{2}$$

$$\Rightarrow 4x_2 = 5 - 2x_1$$

$$\Rightarrow 2x_1 + 4x_2 - 5 = 0$$

Now taking the positive side and his corresponding weights,

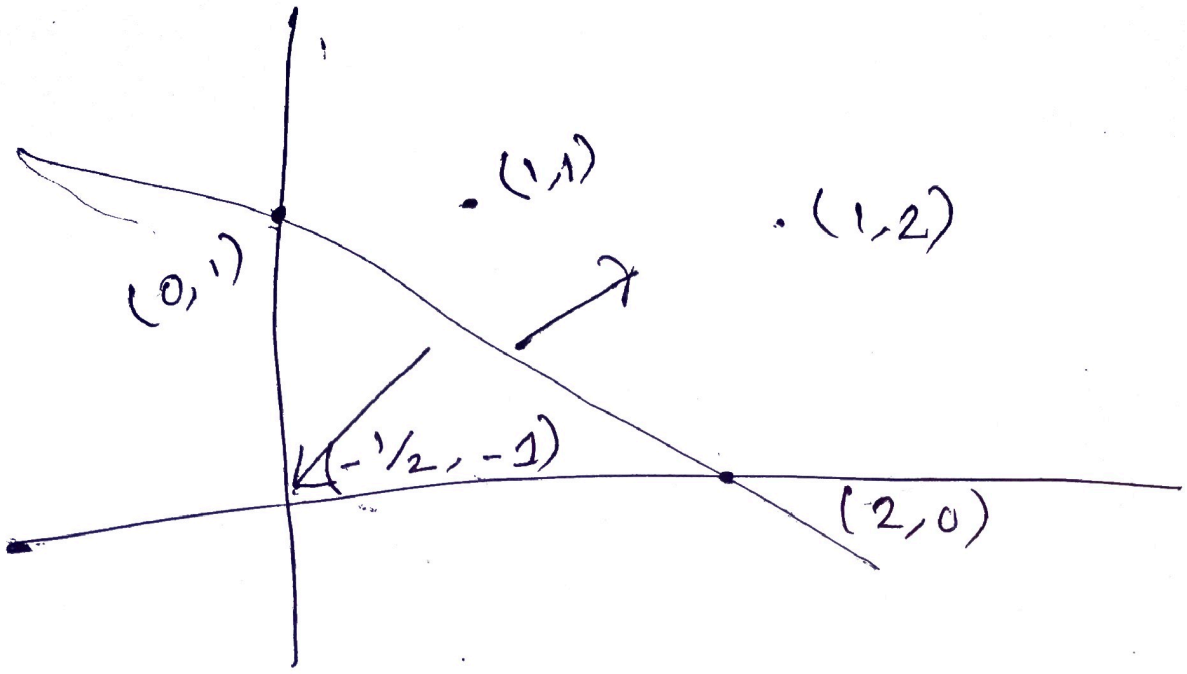
$$w_0 = -5$$

$$w_1 = 2$$

$$w_2 = 4$$

Alternatively, we can get weights. $w_1 = 1$ and $w_2 = 2$

By drawing a vector normal to the separated line, in the direction pointing towards the positive data points,



The bias weight w_0 can be found by computing the dot product of the normal vector with a perpendicular vector from the separated line to the origin.

∴ At last in this situation,

$$w_0 = 1\left(-\frac{1}{2}\right) + 2(-1)$$

$$= -\frac{1}{2} - 2$$

$$= -5/2 = -2.5$$

Ans to the Qus No-02

02

Iteration	W_0	W_1	W_2	training Examples	x_1	x_2	class	$S = w_0 + w_1 + w_2$	Action
1	-1.5	0	2	A	0	1	−	+0.5	Sub tract
2	-2.5	0	1	B	2	0	−	-2.5	None
3	-2.5	0	1	C	1	1	+	-1.5	Add
4	-1.5	1	2	A	0	1	−	+0.5	Sub tract
5	-2.5	1	1	B	2	0	−	-0.5	None
6	-2.5	1	1	C	1	1	+	-0.5	Add
7	-1.5	2	2	A	0	1	−	+0.5	Sub tract
8	-2.5	2	1	B	2	0	−	+1.5	Sub tract
9	-3.5	0	1	C	1	1	+	-2.5	Add
10	-2.5	1	2	A	0	1	−	-0.5	None
11	-2.5	1	2	B	2	0	−	-0.5	None
12	-2.5	1	2	C	1	1	+	+0.5	None.