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Roll no: 2020900003

Q2.
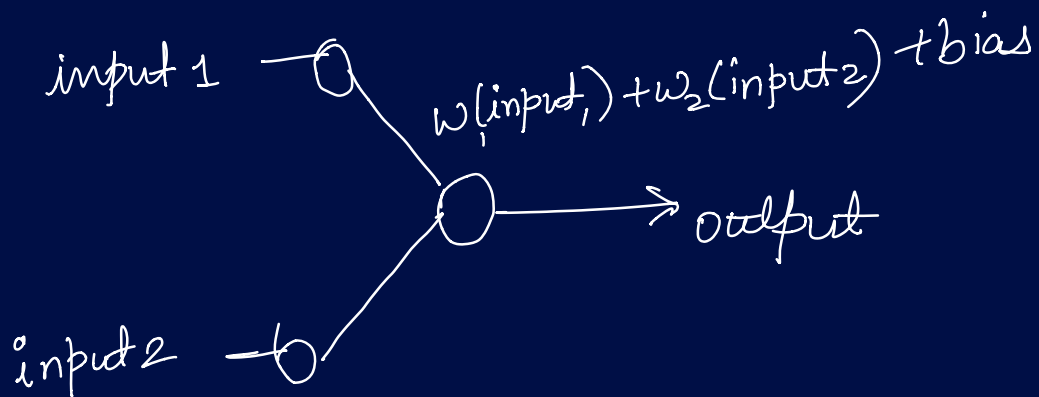
Sol   The boolean function of $A \land \neg B$ is

A	B	B'	A ∧ B'
0	0	1	0
0	1	0	0
1	0	1	1
1	1	0	0

input 1 ⟶

$w_1(\text{input}_1) + w_2(\text{input}_2) + \text{bias}$

⟶ output

input 2

We know that, $y' = 1$ if $wx + b > 0$ and ——(1)
$\qquad\qquad\quad y' = -1$ if $wx + b \leq 0$ ——(2)

For row 1 :— $x_1 = 0 \quad x_2 = 1$

$\qquad$ Initialize w_1, w_2 and b as -1

$\qquad$ In this case linear equation $W_1 * x_1 + W_2 * x_2 + b$

$$= x_1(-1) + x_2(-1) - 1$$

$$= 0 - 1 - 1 = -2 \implies y' = 0 \text{ from } (2)$$

$\qquad$ This row is correctly classified

For row 2 : $x_1 = 0 \quad x_2 = 0$ and $y = 0$

$\qquad$ then $= x_1(-1) + x_2(-1) - 1 = 0 + 0 - 1$

$\qquad$ again $y' = 0$ from (2), classified correctly

For row 3 : $x_1 = 1 \quad x_2 = 1, \ y = 1$

$\qquad$ then $x_1(-1) + x_2(-1) - 1 = -1 - 1 - 1 = -3$

$\qquad$ $y' = 0$, from (2), but this wrongly classified

$\qquad\qquad$ set $w_2 = 1$

$\qquad\qquad\qquad x_1(-1) + 1 - 1 = -1$ still wrong

$\qquad\qquad\qquad\qquad y' = 0$ wrong prediction
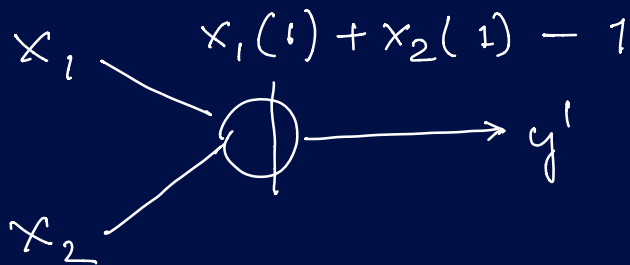
$\qquad\qquad$ set $w_1 = 1$

$$x_1(1) + x_2(1) - 1 = 1$$

$y' = 1$ from ① , now classified correctly

For row 4 : $x_1 = 1, x_2 = 0$ $b = -1$

$$x_1(1) + x_2(1) - 1 = 1 + 0 - 1 = 0$$

$y' = 0$ from ② , classified correctly .

$$x_1(1) + x_2(1) - 1$$

For, weights $w_1 = 1, w_2 = 1$ and $b = -1$