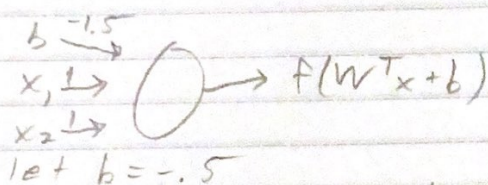10 - 3 in-class assignment

Input	$W^T x + b$	output
(0,0)	-1.5	0
(0,1)	-.5	0
(1,1)	.5	1
(1,0)	-.5	0

$b \xrightarrow{-1.5}$

$x_1 \xrightarrow{1}$ $\bigcirc \rightarrow f(W^T x + b)$

$x_2 \xrightarrow{1}$

$$f(x) = sgn(x) = \begin{cases} 1, & x \geq 0 \\ 0 & else \end{cases}$$

let $b = -.5$

input	$W^T x + b$	output
(0,0)	-.5	0
(0,1)	.5	1
(1,1)	1.5	1
(1,0)	.5	1

$x_1 \sim .2, .7 \quad x_2 \sim -1, -1.2, \quad x_3 \sim .4, 1.2$

10 x_1

30 x_2

20 x_3

$$f(x) = \frac{1}{1-e^{-x}}$$

$h_1 = 10(.2) + 30(-1) + 20(.4) = 7$

$H_1 = \frac{1}{1-e^{-7}} = .999$

$h_2 = -.5$

$H_2 = .00669$

$O_1 = 1.099$

$O_1 = .75$

$O_2 = 3.104$

$O_2 = .957$

$PO_1 = \frac{.75}{.957+.75} = 44\%$

$PO_2 = 56\%$