CIS 419/519: Homework 5

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Although the solutions are entirely my own, I consulted with the following people and sources while working on this homework:

PART1: PROBELM SET

1 Logical Functions with Neural Nets

(a) The NAND logic follows a truth table as follows:

x_0	x_1	$H(x)$
0	0	1
0	1	1
1	0	1
1	1	0

If we use sigmoid as our activation function at the output node, where $\sigma(z) = \frac{1}{1+exp(-z)}$ and $H(x) = \sigma(w_0 + w_1x_0 + w_2x_2)$, where $w_0 = 40$, and $w_1 = w_2 = -25$ we would then have:

x_0	x_1	$H(x)$
0	0	$\sigma(40) = 1$
0	1	$\sigma(15) = 1$
1	0	$\sigma(15) = 1$
1	1	$\sigma(-10) = 0$

The neural network that is used to compute this function is the same as in the graph given in the problem set.

Figure 1: Neural network for NAND Logic