CSDS 440: Assignment 5

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Due on 10/09/2020, submitted early on 10/02/2020

Fall 2020, Dr. Ray

Problem 21

Note for the following neural network, the weights are noted on the edges and the activation thresholds are noted on the top of each neuron (as for the neuron with threshold x will output $+1$ if the input $\geq x$, and output -1 otherwise). Note we omitted x_2 as it is simply a duplication of x_1, and we can design a network without using the former.
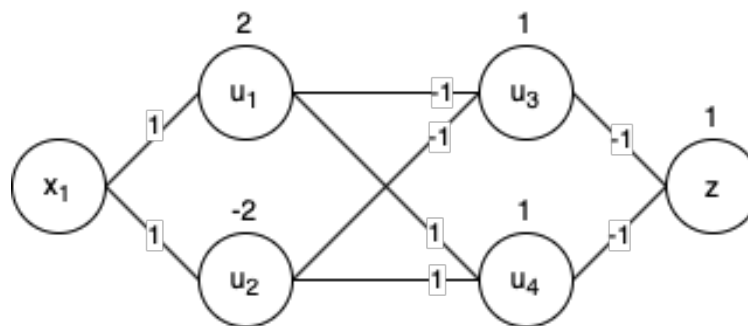
Now to trace each example. Note for each neuron, the inequality is the input against the activation threshold and the output is the one in bracket.

x_1	x_2	u_1	u_2	u_3	u_4	z
-4	-4	$-4 < 2$ (-1)	$-4 < -2$ (-1)	$1 + 1 > 1$ (1)	$-1 - 1 < 1$ (-1)	$-1 + 1 < 1$ (-1)
-1	-1	$-1 < 2$ (-1)	$-1 > -2$ (1)	$1 - 1 < 1$ (-1)	$1 - 1 < 1$ (-1)	$1 + 1 > 1$ (1)
1	1	$1 < 2$ (-1)	$1 > -2$ (1)	$1 - 1 < 1$ (-1)	$1 - 1 < 1$ (-1)	$1 + 1 > 1$ (1)
4	4	$4 > 2$ (1)	$4 > -2$ (1)	$1 - 1 < 1$ (-1)	$1 + 1 > 1$ (1)	$1 - 1 < 1$ (-1)

We have showed the network is able to produce the correct classification.