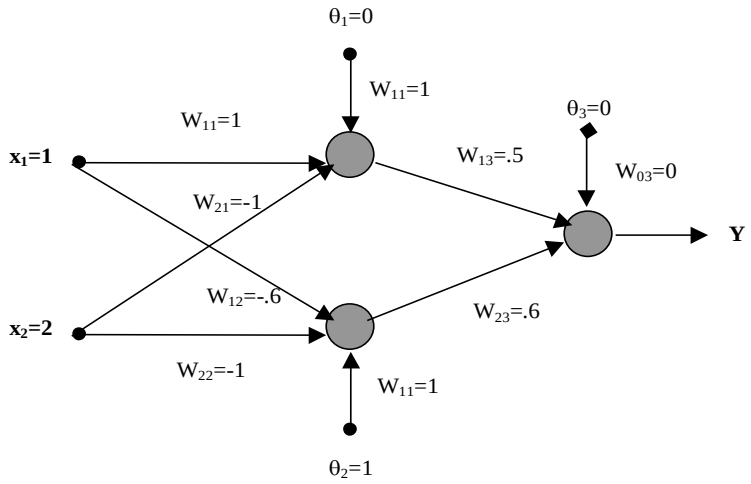
H.W. #2

Summer 2019 **Dr. Zilouchian**

1. Consider the following network:



Obtain the output Y for the following cases:

(a) All the neurons are represented by a linear function with slope of 1 (y=x)

(b) All the neurons are represented by a McCulloch-Pitts model (hard limit activation function with negative threshold zero)

(c) All the neurons are represented based on a sigmoid activation function.

2. Suppose you would like to implement the following logic gates using NN

(a) OR gate

(b) AND gate

(c) XOR gate

for each case, could you utilize one (or two) hidden layer(s) with linear activation function to achieve your goal?

If your answer is yes, justify your answer.

If your answer is no, suggest an alternative solution.

3. Consider the following 2-D inputs:

$[\{-1, -2\}, \{-1,0\}] \in$ C1 and $[\{2,3\}, \{4,1\}] \in$ C2

where C1 is associated with the target zero and C2 is associated with the target one .

(a) Plot the input data in 2-D.

(b) Use a perception to solve the classification problem. What is the decision surface for this problem?

(c) Suppose the new data input is {-2, -2}. Show that your proposed classification is valid.

Hint- Please see example 2.2 on Chapter 2

4. Consider a multi layer feed forward network, all the neurons, which operate with linear activation functions. Justify the statement that such a network is equivalent to a single layer feed forward network.