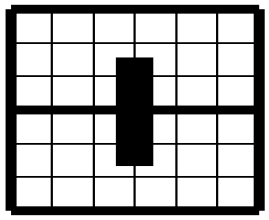
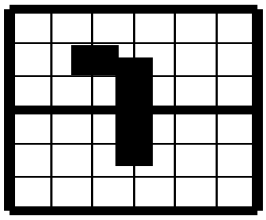
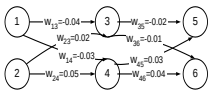
CSCI-580 **Homework 9** **Artificial Neural Networks**

Write a program that will run the back-propagation algorithm for two given examples and the given neural network:







$< x_1, \boldsymbol{y}_1 >=< [0.11,0.11], [\ 0.9, 0.1] >$

$< x_2, \boldsymbol{y}_2 >=< [0.22,0.11], [0.1, 0.9] >$

In addition to the weights shown on Figure above, each node i has a dummy weight $w_{0i} = 0.01$ from a dummy node 0 with the output $\boldsymbol{a}_0 = 1$.

Run it for ***N*** iterations, and output for each value of ***N*** the errors $\Delta_5\ and\ \Delta_6$ and the following weights: $w_{13}, w_{14}, w_{23}, w_{24}, w_{35}, w_{36}, w_{45}, w_{46}$.

Please submit a text file with the output of your program for N=100, 1000, 10000. I prefer you submit it by printing out the results on the paper, but you also can submit a text file (or PDF) via Blackboard. The output format is the following:

N = 100
$error5 =$
$error6 =$
$w13 =$
….
$w46 =$

N = 1000
$error5 =$
$error6 =$
$w13 =$
….
$w46 =$

N = 10000
$error5 =$
$error6 =$
$w13 =$
….
$w46=$

You can use any representation of the neural network, whatever is more time efficient for you to program it (i.e. no restrictions on running time or space complexity).