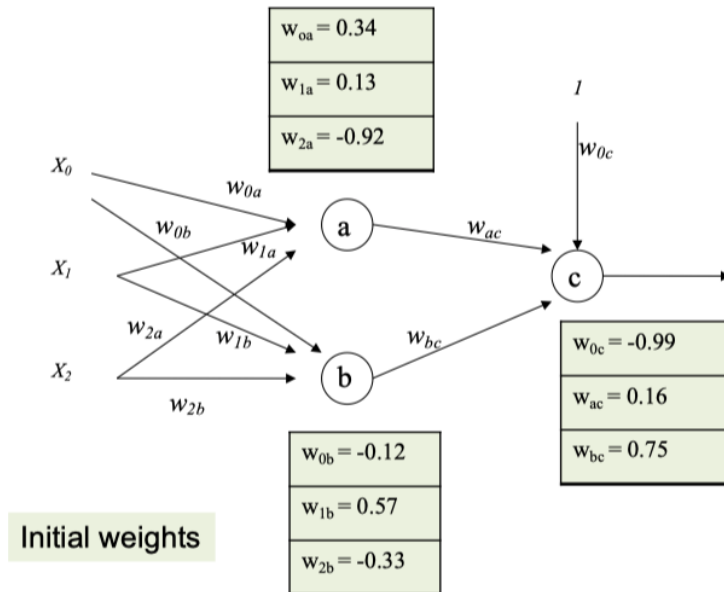**CSCI 6350. Homework 3**

1. Apply the Back propagation algorithm discussed in class to compute the weights of the ANN after training one example data $x_0=1$, $x_1=1$, $x_2=0$, and $y=1$. Assuming the weights of the network are shown in the following network when this training data is evaluated. Set the learning rate to 0.2.



2. Perform K-means clustering on the example data discussed in class.
   a. Let K=2, and the initial seed objects for the two classes be: class 1 (object 3) and class 2 (object 6). Show the clustering results.
   b. Compute the mean squared errors of the clustering result with K=2. Determine which clustering partition size, e.g., k=2 or K=3, is more suitable for this data by comparing the mean squared error results from K=2 clustering partition and K=3 clustering partition (use the results derived during lecture).

P1(1, 1)
P2(2,1)
P3(1.5,2)
P4(4, 4)
P5(5,4)
P6(4,3)
P7(5,2)
P8(5,1)
P9(6,1)
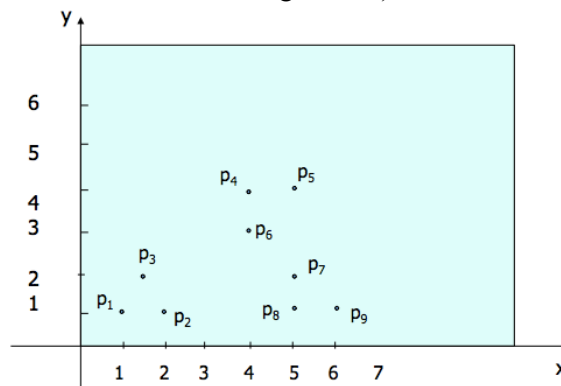


3. In this problem, we study feature selection methods using the Iris data set (https://archive.ics.uci.edu/ml/datasets/iris). Apply the following feature selection methods to pick the top 2 features for this data. (Note: this data has 3 classes, instead

of 2. You can compute the feature selection values for 2 classes at a time, and compute the average over 2 times)

    a. Correlation
    b. Signal to noise ratio
    c. Two tailed t-test
    d. Relief, assuming the two randomly selected objects are:
         i. 4.3,3.0,1.1,0.1,Iris-setosa. (line 14)
        ii. 6.2,2.2,4.5,1.5,Iris-versicolor (line 69)