CSI 5810 (Assignment # 3)

1. The following examples from a two-class classification problem are given:

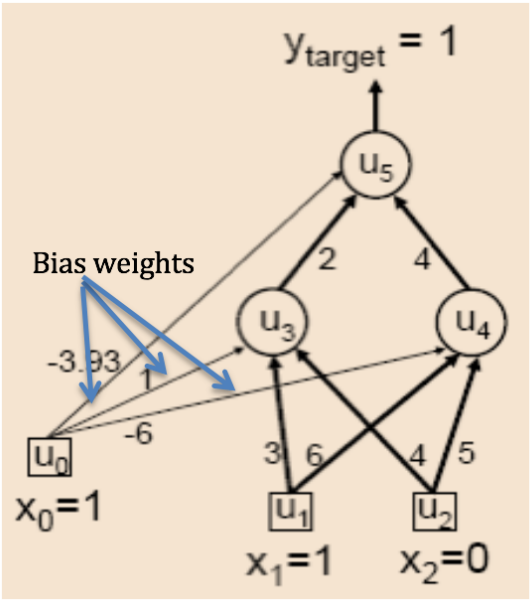
   Class1: $[2\ 2]^T$, $[3\ 5]^T$; Class 2 $[1\ 3]^T$, $[-1\ -0.5]^T$
   Starting with an augmented weight vector, $[1\ 1\ 1]^T$, determine a solution vector for above data using the perceptron learning rule. Show first five steps of weight vector updating.

2. Consider the following six examples with three attributes:

Example #	Color	Shape	Size	Class
1	Red	Square	Big	+
2	Blue	Square	Big	+
3	Red	Round	Small	-
4	Green	Square	Small	-
5	Red	Round	Big	+
6	Green	Square	Big	-

   Determine the best attribute for root node of a decision tree classifier for above data. Use Gini index for attribute selection.

3. Consider the network of neurons shown on the next page. With the current input and the weights as shown, determine the output of the network. Assume sigmoidal activation function. With the specified target output of "1", determine the value of the updated weight for the connection linking U_3 and U_5, and U_3 and U_1.



4. Generate 250 examples each from two classes as per the picture shown below and train a two-layer feedforward network with three sets of hidden neurons, 10, 20, and 30. In each case, determine the training and test accuracy and plot the resulting boundaries.