Artificial Intelligence (CPS 170) : Homework 5

Due April 25, 2006
(Will be accepted without penalty through April 28)

Problem 1: Prove that a 3 layer neural network (one hidden layer) can recognize any boolean function of inputs $X_1 \ldots X_n$ if you assume that you have a total of $2n$ inputs so that for each X_i you have one input for X_i and one for $\overline{X_i}$.

Problem 2: Consider the problem of clustering 3 points in the plane into two clusters using k-means. Give an example where you can get k-means to produce 3 different clusterings based upon different initial cluster center guesses.

Problem 3: Do problem 16.11.

Problem 4: Do problem 17.1.

Problem 5: Do problem 17.4.