CIS 716 Homework 1

1. Give an example, from a film, TV show or book, of an intelligent machine. Why do you consider thsi machine to be intelligent? Could the machine pass the Turing test (and why/how)?

   (10 points)

2. For the machine you gave as an aswer in Q1, classify the environment in which it operates as

   - Accessible *or* inaccessible
   - Deterministic *or* non-deterministic
   - Episodic *or* non-episodic
   - Static *or* dynamic
   - Discrete *or* continuous

   As part of your answer, you should explain *why* you classify the environment in the way you do.

   (10 points)

3. Design by hand a neural network to implement the parity function of two inputs x_1 and x_2:

x_1	x_2	output
0	0	1
1	0	0
0	1	0
1	1	1

   This means decide the connections between TLUs (you will need more than one) and the weights on inputs and on connections.

   Your network should have a *hidden* layer of TLUs (that is a set of TLUs that are not connected to the output) which each have inputs x_1 and x_2, and an output TLU with inputs from the output of the hidden layer (and no direct input from x_1 or x_2).

   (20 points)

4. Given the following training set:

input	output
1 0 0	1
0 1 1	0
1 1 0	1
1 1 1	1
0 0 1	0
1 0 1	0

train a TLU by hand:

(a) Using the Widrow Hoff procedure

(b) Using the error-correction procedure.

You will need to have four inputs (including the one that implements the threshold).

Start training with all weights equal to 0 and $c = 0.5$, and train once on each example in the training set.

Show the set of weights after each example.

(60 points)