**Kerry Ojakian's CSI 30 Class**
**Class Assignment #8**

1. Draw the neural net that has 2 inputs and 4 outputs given by the following weight matrix.
$$\begin{bmatrix} 3 & 0 & -2 & 0 \\ 0 & 2 & 0 & -1 \end{bmatrix}$$

2. Suppose a 3-layer neural net uses matrix $A$ to go from layer 1 to layer 2, and matrix $B$ to go from layer 2 to layer 3.
$$A = \begin{bmatrix} 1 & 2 & -2 \\ 0 & 2 & 0 \end{bmatrix}, B = \begin{bmatrix} 3 & 0 \\ 0 & 2 \\ 1 & -2 \end{bmatrix}$$

   (a) How many neurons does each layer have?

   (b) Find one matrix which can be used to go directly from layer 1 to layer 3.

3. Design a neurel net with input layer of size 2, and one output layer of size 1 (which uses the Heaviside function), which computes the AND-function; that is: you just care about the 0, 1 inputs, and it must give AND on those inputs. Draw your neural net and describe it using matrices.

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4. Design a neurel net (show the matrices) with input layer of size 4, and one output layer of size 4, which does not change the input, that is it is the identity function, assigning input vector $x$ to output vector $x$.

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5. Design a neurel net (show the matrices) with input layer of size 2, output layer of size 1, with one hidden layer (which uses a ReLU), so that if the inputs are both positive, then the final output is $> 0$, and if the inputs are both negative, then the final is $\leq 0$.

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