TTIC 31230: Fundamentals of Deep Learning
Problem set 1
Due Friday, October 9 (11:59pm)

This problem set involves understanding and modifying the education framework (EdF). Everyone should start by installing Anaconda with Python 3.5 (https://www.anaconda.com/products/individual). Then open a terminal and go to the problem set directory. Then enter "jupyter notebook". This should open a window in your browser from which you can open PS1.ipynb (for Interactive PYthon NoteBook). You can also open the source code edf.py of the framework. It is 150 lines of Python.

You are to expand the framework EdF by adding an implementation of $\text{ReLU}(x) = \max(0, x)$ and of $\tanh(x) = (e^x - e^{-x})/(e^x + e^{-x})$. Fill the missing code for the forward/backward methods of ReLU and tanh in the jupyter notebook. Then, run the following cells to train networks using ReLU and tanh as activation functions.

In the notebook you will also explore how the learning rate and number of layers affects the performance of the neural network. For that, you will need to implement missing functions and classes in the notebook, and then run the following cells.

You should turn in your complete jupyter notebook.