COGSCI 131 – Assignment 1
DUE: January 31 at class start

1a. [10pts] Suppose that we repeatedly pair a light with food. Plot the association strength between light and food according to the Rescorla-Wagner model for $\lambda=1.0$, $\alpha=0.75$, $\beta=0.1$ for an initial association of 0.05 and for 0.5. Plot 20 trials.

1b. [3pts] How many trials will it take to reach $V_{light}=0.8$ if the initial association is 0.05?

1c. [5pts] Suppose, with $\lambda=1.0$, $\beta=0.1$, that it takes a 13 trials for a bell's association with food to exceed 0.8. What is the salience? Show your work/code (it is acceptable to solve numerically).

2. [10pts] Suppose that you begin with an association of a light and food of 0.8. Now, you want to teach a new association between a bell and food, while the light is present (thus you pair light, food, bell all together). Plot the association strength between bell and food as a function of the number of trials.

3a. [10pts] Suppose you repeatedly alternate trials, pairing a bell and food and a bell and no food. If you do this for a long time, what will the association strength be if $\lambda=1.0$. Make a plot of what happens and provide an intuitive explanation for why.

3b. [5pts] Suppose that, on a given trial, with probability P you pair a bell with food, and with probability 1-P you pair a bell with no food. What will the association strength be after many trials of this, if you assume $\lambda=1.0$? Plot some examples. Provide a short intuitive explanation on Marr's computational level.

4. [10pts] In the Rescorla-Wagner model, salience plays essentially the same role as learning rate. In a sentence or two, describe why, psychologically, we think there are different factors here. In a sentence or two, describe an experiment that would let you disentangle salience and learning rate.