CS786 Quiz 1

Q1. Kamin blocking is a classic conditioning experiment wherein a dog (say) is conditioned with food in the presence of a light first, then with food in the presence of both the light and a sound. On testing, it turns out that the dog fails to respond when tested with just the sound. Can the Rescorla-Wagner model predict this effect? Assume a maximum association strength of 100, a attention and salience parameters of 0.8 each, and sketch out a quantitative explanation for why the model does (or doesn't) explain the effect. (20 marks)

Q2. What is David Redish's explanation for cocaine addiction? The case of cocaine is special, because it is known to increase the concentration of serotonin, dopamine and a number of other neurotransmitters in the brain. Can Redish's explanation be generalized to other drugs, like heroin, which don't increase neurotransmitter concentration? (20 marks)

Q3. Draw a diagram showing the primary components of a symbolic cognitive architecture. (20 marks)

Q4. Given an image patch $\begin{matrix} 2 & 2 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{matrix}$ and a filter $\begin{matrix} 0 & 1 \\ 0 & 1 \end{matrix}$ what will the convolved feature representation look like? (20 marks)

Q5. **Take home problem**. On the course webpage, you will see a link to Matlab/Octave code implementing the TD learning algorithm.

(a) comment the code to show that you understand what has been done (5 marks)

(b) modify the code to implement a Q-learning algorithm on the same problem. Be sure to comment your code appropriately. You may have to modify the legal_moves function also. (15 marks)