WORKSHEET FOR EXERCISES FROM CHAPTER 20

EXERCISE 20.1

1. **For a network that was able to learn the problem, how many sweeps of training were required? When it converged, what was the network's SSE?**

2. **Examine the weights of this network, both for the hidden units and for the output units. How does the structure of your network compare to structure of the Rumelhart, Hinton, and Williams' network that was described above?**

3. **Is there anything puzzling or surprising about the structure of your network? (Hint: look at the weights from input unit 3 to either of the hidden units)**

4. **You likely encountered many "stalls" along the way. Is there any general characteristics of them (SSE, numbers of hits and misses) that you could use to identify them during training, and thus use these characteristics as a signal that you would have to reset the network and try to train it from scratch again?**

EXERCISE 20.2

1. **In very general terms, describe the dynamics of learning – give a brief description of whether SSE constantly decreased to the local minima value, or whether during different "periods" of learning, SSE changed at different rates. You could tell a similar story about changes in hits and misses over the course of training the network.**

2. **Take a look at one of your almost-converged networks. Why did it fail – is it generating fairly large errors to many patterns, or is it just having problems with one pattern? If it is having problems with one pattern, which pattern is it?**

3. **If you are fortunate enough to have a network converge to a solution to this problem, examine its connection weights and biases. How does it solve the symmetry problem? How does this solution relate to the one represented in a two-hidden unit network?**

4. **On the basis of the simulations that you carried out in this chapter, which type of network has more difficulty with the symmetry problem (if any)? If you think that there is a difference between the two types of network, briefly speculate on why this difference might exist.**