WORKSHEET FOR EXERCISES FROM CHAPTER 14

EXERCISE 14.1

1. **Examine the responses of the network to the training set, as well as the errors computed for each output unit and each training pattern. Your network should be having difficulties with four of the logical operations. What logical operations are causing the perceptron difficulty? (Note: if an output unit is generating three correct responses for a logical operation, but is generating an error for the fourth response, then we will say that this operation is posing a problem, simply because the output unit has failed to respond correctly to all of the input patterns.)**

2. **Focus on the errors being made by the perceptron in more detail. For each output unit that is making at least one error, describe the output unit's response to each of the four input patterns.**

3. **For each output unit that is making at least one error, examine the threshold for that unit as well as the two connection weights that are feeding into that unit. Use this information, in the context of your description of responses in question 2, to explain why the output unit is not responding correctly. (Remember – if you used the Delta rule, then the output units are using the step activation function.)**

4. **On the basis of your answer to question 3, is it possible in principle for these incorrect output units to eventually learn to respond correctly, or are they doomed to eternal failure? If you think that they can respond correctly, then explain why, and return to the program to try to validate this belief empirically. (Hint: I don't recommend this latter approach!)**

5. **Compare the difficulties that you found for this network with the difficulties that you found for the network in Chapter 12. Are they the same? If not, then why not? What are the implications of this comparison for choosing a perceptron to solve a particular pattern classification problem?**