Decision Theory Assignment 2

This assignment is due Thursday, September 11.

1. The sensitivity and specificity of a test are inherent properties of the test, but the performance of the test is dependent on the population being tested. Suppose that a test has sensitivity .9 and specificity .95 (like that discussed in class), and suppose that (a) it is being used to test for a condition which has a true incidence of 1 in 4, and (b) that it is being used to test for a condition which has a true incidence of 1 in 100. A population of 10,000 is tested. Compute in each case the number of true positive results and the number of false positives. Is the test adequate for each of these two cases? Comment.
2. Two bags each contain 100 poker chips; from the outside they are identical. In the first, the “green bag” 70 of the chips are green and 30 white. In the second, the “white bag”, 30 are green and 70 are white. One bag is removed. You are required to play a game in which you will receive $100 if you correctly identify the remaining bag and will lose $100 if you don’t. Before you make your choice one ball is drawn from the remaining bag and displayed. It is green. You can pay to have another ball drawn. What is the value of the information you would receive? (Theoretically this is the maximum amount you would be willing to pay; in practice you wouldn’t actually be willing to pay that much.)