

Assignment #10

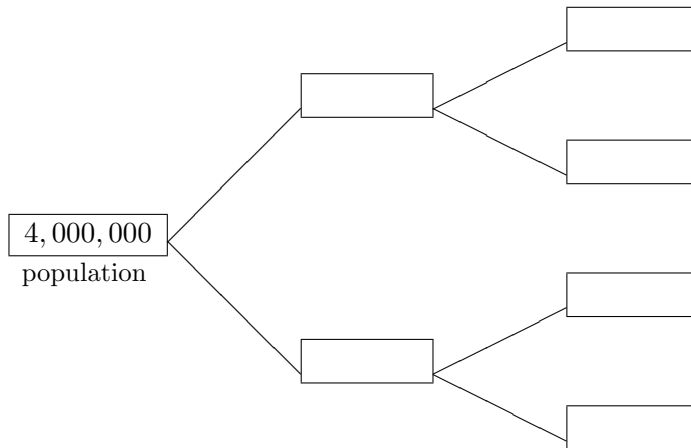
Due on Monday, November 12, 2007

Read Section 4.2 on *An Introduction to Probability*, pp. 116–127, in Allman and Rhodes.

Read Section 4.3 on *Conditional Probabilities*, pp. 130–134, in Allman and Rhodes.

Do the following problems

1. Problem 4.2.3 on page 128 in Allman and Rhodes.
2. Problem 4.2.5 on page 128 in Allman and Rhodes.
3. Suppose a clinic in a large city uses a new test to determine if a patient has hepatitis. If a person tests *positive*, then the test is telling us that he/she does have hepatitis (the test could be wrong!) Similarly, if a person tests negative, then the test's conclusion is that he/she does not have hepatitis. Assume that out of every 100 people who do have hepatitis, 95 test positive (that is, the test result is that they do have hepatitis) and 5 test negative. Out of every 100 people who don't have hepatitis, 90 test negative and 10 test positive. Suppose that among the 4 million people who live in the city, 0.05% do have hepatitis.
  - (a) Complete the chart below. First decide on what the branches represent (there are two ways to do the branching but the information provided is suitable for only one of them). Then, for each of the boxes, find the corresponding number of people. Be careful not to make any assumptions other than the facts presented above.



- (b) A person is selected at random and given the test. If the test is positive, what is the probability that the person actually has hepatitis.

*Hint:* Recall than in calculating a probability you write a fraction. Make sure that you choose the numerator and the denominator thoughtfully.

- (c) Is your answer to the previous part surprising? In what way?

4. Problem 4.3.3 on pages 134 and 135 in Allman and Rhodes.

5. Problem 4.3.4 on page 135 in Allman and Rhodes.