

22s:039
Homework 2

Assigned Friday, September 11
Due Friday, September 18 at classtime

Topics: Probability, Conditional probability, Independence, Bayes theorem.
And Introduction to Discrete Random Variables.

Do all parts of following book problems unless otherwise stated.

2-52

2-61

2-76

2-84 Parts a, b, c, and f

2-89

2-97 Part a

2-105

2-114

3-20 Notice that each system *either* correctly classifies or misclassifies, and that there are different combinations of system misclassifications that lead to $X = 1$ or $X = 2$.

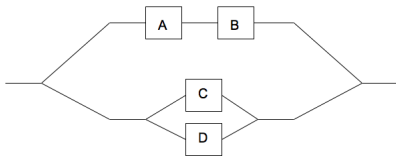
Do the following written problems:

2A-1 The proportion of people in a given community who have a certain disease is 0.005. A test is available to diagnose the disease. If a person has the disease, the probability that the test will produce a positive signal is 0.99. If a person does not have the disease, the probability that the test will produce a positive signal is 0.01.

If a person tests positive, what is the probability that the person actually has the disease?

{continues on back...}

2A-2 A system consists of four components connected as shown in the following diagram.



Assume A, B, C, and D function independently. If the probabilities that A, B, C, and D fail are 0.08, 0.06, 0.08, and 0.20, respectively, what is the probability that the system functions? (*Hint: work this problem in three distinct steps, each of which was discussed in class*)

2A-3 Below is a probability mass function for the discrete random variable X:

\underline{x}	$\frac{P(X=x)}{\quad}$
-1	0.25
0	0.50
1	0.20
2	0.05

(a) Determine $P(X \leq 1)$

(b) Determine $P(X \leq 1.5)$