WS for December 15th : 1016-351: Coverage – Bayes, 3.1, 3.2: Dr. Chulmin Kim

1. **[Incidence of a rare disease]** P(individual has the disease) = .001, P("+" | individual actually has the disease) = .99, and P("+" | individual actually does not have the disease) = .02. To use Bayes' Theorem, determine the P(individual actually has the disease | "+").

2. **[Smarty vs. Dummy]** Brown has recently been hired by a shop down town to help customers with various computer related problems. Lately, two different viruses have been bugging many customers — virus Dummy and virus Smarty. It is estimated that about 65% of the customers with virus problems are bothered by virus Dummy and the remaining 35% by virus Smarty. If the computer is infected by virus Dummy, Brown has a 90% chance of fixing the problem. However, if the computer is infected by the virus Smarty, this chance is only 70%.

   a. If a virus-infected computer is randomly selected from the shop, and we know it was fixed by Brown, what is the probability that it was infected with virus Dummy?

   b. A virus-infected computer is randomly selected from the shop. It is infected with virus Dummy. What is the probability that it cannot be fixed by Brown?

   c. A virus-infected computer is randomly selected from the shop. What is the probability that it is infected with virus Dummy and cannot be fixed by Brown?

3. Two fair dice are rolled independently. Let X be the minimum of the two rolled [so $X(2,4)=2$, $X(5,5)=5$, etc.].

   a. What is the pmf of X, $p(x)$? [Hint: First determine $p(1)$, and so on.]

   b. What is the cdf of X, $F(x)$?

   c. Sketch the graph of the cdf of X, $F(x)$.