CSE 312: Foundations of Computing II
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Lecture Topics: 2.1 Discrete Probability, 2.2 Conditional Probability

[**Tags**: Bayes Theorem, Law of Total Probability]

1. Sometimes, doctors run tests to see if we have a disease, but they might not be perfectly accurate. Suppose we are testing for the llama-flu, a highly contagious new disease. So far, only 0.1% of the population has it. If you have llama-flu, the probability the test is negative is 2%. If you don't have llama-flu, the probability the test is negative is 95%. The most important question after all of this: if you test positive, what is the probability you have llama-flu?

[**Tags**: Equally Likely Outcomes, Bayes Theorem, Law of Total Probability]

2.

Suppose we have three urns with the following number of red, white, and blue balls in them:

Urn	Red	White	Blue
A	6	5	2
B	4	3	6
C	5	6	7

Suppose we choose an urn by the following rules, after flipping a fair coin three times independently:

(a) If all flips are the same, pick from Urn A

(b) If there is exactly one head, pick from Urn B

(c) Else, pick from Urn C

After choosing an urn, we draw 5 balls without replacement, and let R be the event that exactly three of them are red. Let A, B, C be the events we chose urn A,B,C respectively. What is the probability we chose urn C, given that we drew exactly three of the five balls being red? We'll solve this in three steps.

(a) First, find $\Pr(A)$, $\Pr(B)$, $\Pr(C)$.

(b) Now find $\Pr(R)$, and do not simplify.

(c) Finally, compute $\Pr(C \mid R)$, and do not simplify.

For more examples and solutions (S01 and S02), see
https://courses.cs.washington.edu/courses/cse312/18sp/.