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LING723

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Homework #1 – Written Portion

{Academic honesty note: I worked on question #2 and compared answers for #1 with Alan Mischler. The program code turned in for this assignment was completed on my own.}

Probability

1. A fair coin is tossed three times. What is the probability that exactly two heads occur, given that:

a. The first outcome was a head?

P(HHT|H) = P(H=3, T=2|H) + P(T=3, H=2)

= ¼ + ¼ = **½**

b. The first outcome was a tail?

P(HHT|T) = P(H=2, H=3|T)

= (½)(½) = **¼**

c. The first two outcomes were heads?

P(HHT|HH) = **½**

d. The first outcome was a head and the third outcome was a head?

P(HHT|H=1, H=3) = **½**

2. Marie is getting married tomorrow, at an outdoor ceremony in the desert. In recent years, it has rained only 5 days each year. Unfortunately, the weatherman has predicted rain for tomorrow. When it actually rains, the weatherman correctly forecasts rain 90% of the time. When it doesn't rain, he incorrectly forecasts rain 10% of the time. What is the probability that it will rain on the day of Marie's wedding?

Probability of a forecast of rain =>

P(F) = (5/365)(.9) + (360/365)(.1)

Probability of rain with a forecast =>

P(R|F) = P(R when F)/P(F)

((5/365)(.9))/((5/365)(.9)+(360/365)(.1)) = **1/9** or **11%**

Extra credit limerick:

We've taught computers so much
I worry they may be a crutch
When they can teach themselves
The language of the elves
I know that they know too much!