Statistics for laboratory scientists

Solutions for the homework problems for lecture 5

1.
   a. Pr(F_2 seed is smooth) = 3/4 = 75%

   b. Pr(F_2 seed has genotype ***Aa***) = 1/2 = 50%

   c. Pr(F_2 seed has genotype ***Aa*** | it is smooth) = (1/2)/(3/4) = 2/3 = (approx) 67%

   d. Pr(F_3 seed is smooth | F_2 has genotype ***AA***) = 100%

   e. Pr(F_3 seed is smooth | F_2 has genotype ***Aa***) = 3/4 = 75%

   f. Pr(F_3 seed is smooth)
   = Pr(F_3 is smooth | F_2 is ***AA***) x Pr(F_2 is ***AA***) + Pr(F_3 is smooth | F_2 is ***Aa***) x Pr(F_2 is ***Aa***) + Pr(F_3 is smooth | F_2 is ***aa***) x Pr(F_2 is ***aa***)
   = [1 x (1/4)] + [(3/4) x (1/2)] + [0 x (1/4)] = 5/8 = 62.5%

   g. Pr(F_3 seed is smooth | F_2 is smooth)
   = Pr(F_3 is smooth | F_2 is ***AA***) x Pr(F_2 is ***AA*** | F_2 is smooth) + Pr (F_3 is smooth | F_2 is ***Aa***) x Pr(F_2 is ***Aa*** | F_2 is smooth)
   = [1 x (1/3)] + [(3/4) x (2/3)] = 5/6 = (approx) 83.3%

2.
   a. (5/10) x (5/10) = 1/4 = 25%

   b. 100%

   c. If 1st ball was blue, then we must be drawing from urn A, and so Pr(2nd is red | 1st is blue) = 50%.

   d. Pr(2nd is red and 1st is red) = Pr(both are red and coin was heads) + Pr(both are red and coin was tails) = Pr(coin was

heads) x Pr(both red | coin heads) + Pr(coin tails) x Pr(both red | coin tails) = (1/2) x (1/4) + (1/2) x 1 = 1/8 + 1/2 = 5/8 = 63%.

Similarly, Pr(1st is red) = (1/2) x (1/2) + (1/2) x 1 = 1/4 + 1/2 = 3/4 = 75%.

Thus, Pr(2nd is red | 1st is red) = (5/8) / (3/4) = 5/6 = 83%.

3.

a. 4/52 = 1/13 = 7.7%

b. 1/13 = 7.7%

c. 2/50 = 1/25 = 4%

d. Pr(all are Jacks) = Pr(1st is Jack) x Pr(2nd is Jack | 1st is Jack) x Pr(3rd is Jack | 1st two are Jacks) = (4/52) x (3/51) x (2/50) = 3/16575.

e. (48/52)x(47/51)x(46/50) = 78%

f. Pr(at least one is a Jack) = 1 - Pr(none are Jacks) = 22%.

[3rd term syllabus | 4rd term syllabus | R for Windows]

Last modified: Wed Feb 22 09:44:38 EST 2006