

MATH 113: DISCRETE STRUCTURES
HOMEWORK DUE FRIDAY WEEK 10

Problem 1. You have three coins. Two of the coins are fair: when flipped they are equally likely to land heads or tails. One coin, however, is weighted somehow so that its probability of landing heads is $3/4$.

- (1) Choose one of the three coins uniformly at random and flip it. What is the probability the result is heads? For your solution, number the coins 1, 2, 3 with coin 3 being the weighted one, and let A_i denote the event that coin i was chosen. Apply the generalized law of total probability (Theorem 5.7 in the Course Log).
- (2) Choose one of the three coins at random and flip it. It lands heads. What is the probability that you chose the weighted coin? (Hint: Bayes' law.)

Problem 2. Reconsider the Monty Hall problem as stated in the Course Log but where the gameshow has a bias for where it places the car so that $P(A) = 0.4$, $P(B) = 0.35$, and $P(C) = 0.25$. (In advance of your turn on the show, suppose that you study taped shows and have determined these propensities.) What door should you pick to begin with? What are your chances of eventually winning the car if you make that pick?