AMS 80A: Gambling and Gaming (Spring 2014)

Homework assignment 5

1. The martingale betting system is one of the several betting strategies that have been devised for the game of roulette. Under this strategy, the player doubles the bet after every loss, such that the first win recovers all previous losses and adds a gain equal to the amount of the original bet. For instance, consider using this system to bet on black color in roulette with an initial bet of $1. Assume the first spin results in red or green color. Then, until the ball falls into a black pocket, you would bet: $2 on the second spin, $4 on the third spin, $8 on the fourth spin, etc. (note that the corresponding total amounts you would bet are $3 on the second spin, $7 on the third spin, $15 on the fourth spin, etc.). Suppose you decide to use the martingale betting system to bet on black color in an (unbiased) American roulette, starting with an $1 bet. Suppose also that you have a total of $63 available, and therefore you will run out of money after 6 consecutive spins resulting in either red or green color. What is your expected profit?

2. Exercises 3 and 4 from “Exercise Set A” (page 290), Chapter 17 of the Freedman, Pisani and Purves book. Note that what is referred to in both problem statements as the “expected value for the net gain” is the expected total profit. Also, for these problems as well as the following exercises, you can work with the probabilities associated with an unbiased American roulette.


Note: A copy of Chapter 17 from the Freedman, Pisani and Purves book is available under the Attachments link of the course webpage.