

HOMWORK SET #5: DUE DECEMBER 3

- (1) A fair coin is tossed 100 times. What is the probability that on two consecutive tosses, it landed the same (i.e. both were heads, or both were tails)?
- (2) I toss a fair coin 100 times. What is the probability that in some 10 consecutive throws, the coin landed tails an even number of times?
- (3) A basket is filled with M green apples and N red apples. We remove apples one at a time, at random, until we have removed all the green apples. What is the probability that the basket is empty when we finish?
- (4) Choose two real numbers from $[0, 1]$ and let them be the endpoints of an interval. Repeat this process n times, so that you end up with n intervals in total, which may or may not intersect. Prove the probability that no two intervals intersect is

$$\frac{1}{1} \cdot \frac{1}{3} \cdot \frac{1}{5} \cdots \frac{1}{2n-1} = \prod_{j=1}^n \frac{1}{2j-1}.$$

- (5) Find (with proof) 3 trees having 5 vertices each that are pairwise not isomorphic.