

STAT 134: Section 6

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Conceptual Review

When do we want to use indicators instead of the weighted sum formula to calculate expectation? What's the rule for choosing indicators?

Problem 1

In a well-shuffled standard deck of cards, we are interested in the number of adjacent pairs; i.e., cards which are the same rank as the card before or after them in the deck. Calculate the expected number of adjacent pairs.

Hint: consider the probability that a card is the same as the card before it.

Problem 2

Suppose we have n unique pairs of chopsticks in a drawer (so $2n$ sticks in total). Hurrying to prepare for dinner, we grab k pairs of these at random from the drawer and try to make matching pairs from this pile of $2k$ chopsticks. Let X represent the number of matching pairs. Find $\mathbb{E}(X)$.

Quiz Review: Quiz 1 Problem 4

In a non-leap year February has 28 days, September, April, June and November have 30 days and October, December, January, March, May, July and August have 31 days. Suppose there are 30 students in a zoom meeting all born on a non-leap year. Find:

- (a) The probability that they are all born on the 31st day of a month. (i.e. they are all born on one of Jan 31st, Mar 31th, ... or Dec 31th).
- (b) The probability that they are all born on the same day of a month. (e.g. they are all born on one of Jan 2nd, Feb 2nd, ... or Dec 2nd).
- (c) The probability that except for the 1st day of a month, every day is someone's birthday.