Stat 134: Section 8

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Conceptual Review

Please discuss these short questions with those around you in section. These problems are intended to highlight concepts from lecture that will be relevant for today's problems.

a. State Markov's Inequality and Chebyshev's Inequality.

Problem 1

Consider a grid of n^2 cups, with n rows of n cups. Toss n ping pong balls at random into these cups, where at most one ball can occupy a particular cup. Let X be the number of unoccupied rows (i.e., where every cup in that row contains no balls). Find $\mathbb{E}(X)$.

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 $2k$ 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 $\mathbb{E}(X)$.

Problem 3

Suppose that bundles of yarn are 60 meters long on average, with an SD of 5 meters, and that bundles are independent of one another. In terms of n, find an upper bound (less than 1) on the probability that the total length of n bundles is less than 200 meters, for $n \geq 4$.

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