

1. What is the variance of the sum of 4 fair dice?
2. Show that if I return n people's hats at random, the probability more than 10 people get the correct hat is less than or equal to $\frac{1}{100}$.
3. Suppose I receive one of n possible toys at random when I buy a box of cereal. Find the expected # of boxes of cereal I must buy to receive all n toys.
4. Find a recurrence relation for the # of ways to cover an $2 \times n$ checkboard with 1×2 dominos.
5. Find a recurrence relation for the # of bit sequences with an even # of zeros.