Probability Club

12th February 2025

Problem 1. Coupon collector. Suppose there are n types of toys, which you are collecting one by one, with the goal of getting a complete set. When collecting toys, the toy types are random (as is sometimes the case, for example, with toys included in cereal boxes or included with kids' meals from a fast food restaurant). Assume that each time you collect a toy, it is equally likely to be any of the n types. What is the expected number of toys needed until you have a complete set?

Problem 2. Negative hypergeometric distribution. An urn contains w white balls and b black balls, which are randomly drawn one by one without replacement, until r white balls have been obtained. The number of black balls drawn before drawing the r^{th} white ball has a *Negative Hypergeometric* distribution with parameters w, b, r. Find this distribution.