

Consider throwing n balls into n bins uniformly at random. Let X be the number of balls in the first bin.

- a) What is the expected value of X ?
- b) What is the variance of X ?

What is the covariance of X and X^3 where X is a uniformly distributed variable on the interval $[0, 1]$? (i.e. $X \sim U[0, 1]$)