Revisit of the Discrete Probability Models – this time we pay attention to parameters

Binomial (n,p): n is the number of Bernoulli trials, p =P(success)
X = number of successes in n trials

Negative Binomial (k,p) k is the number of successes, in Bernoulli trials, that one is waiting for, p=P(success)
X= number of failures needed to get k successes

Hypergeometric (n1,n2,k) n1 is the number of type 1 things, n2 the number of type 2 things, and k is the size of the sample obtained at random from the n1+n2, without replacement.
X = number of type 1 objects in the sample of size k

Poisson(m) m is the mean of this distribution. (Special case: when λ is rate of events, and t is the duration that they can happen, then we set $m=\lambda t$.)
X= number of events that occur in a specified period of time (continuous time).

In ch 1 we used mean and variance (or standard deviation preferably) to describe frequency distributions of data. Probability distributions also are described by mean and variance, and the probability distributions associated with the above parametric models have mean and variance that are functions of their parameters. We need to learn these functions – it helps in applying the models to specific applications. The text describes the various tricks that can be used to compute means and variances directly from the probability laws. Here are the answers.

Binomial: mean = np, var = np(1-p)
Negative Binomial mean = k(1-p)/p var=$k(1-p)/p^2$
Hypergeometric mean = k * (n1/(n1+n2))
var = [(n1+n2-k)/(n1+n2-1)]*k*[n1/(n1+n2)]*(1-n1/(n1+n2))
Poisson mean = m var = m

Examples:

Binomial: Toss a coin 10 times, a biased coin P(H)=.6. Then mean = 6 var = 2.4
Neg Binomial: Same coin, how many tails til 3rd head? mean = 2 var = 3.33
Hypergeometric: sample 10 from 25, from 5 W 20 B, n1=5, n2=20, k=10
mean = 2 var = 1
Poisson: accidents happen 2/hr. how many in 8 hrs? So mean (parameter = 16)
mean = 16 var = 16