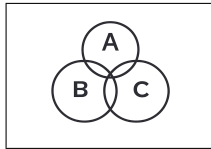


**J**

# Hyper-geometric Random Variable

**J**

$$\begin{aligned} N &= 5 \\ K &= 2 \\ n &= 2 \\ k &= 1 \end{aligned}$$

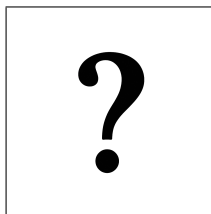


$$P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X = 1) = \frac{\binom{2}{1} \binom{3}{1}}{\binom{5}{2}} = \frac{2 \times 3}{10} = \frac{6}{10} = \boxed{0.6}$$

$$E[X] = n \frac{K}{N}$$

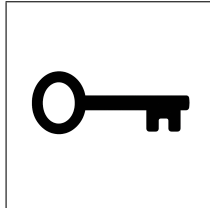
$$\text{Var}(X) = n \frac{K}{N} \left(1 - \frac{K}{N}\right) \frac{N-n}{N-1}$$



$$\begin{aligned} N &= 24 \\ K &= 4 \\ n &= 6 \\ k &= 0 \\ P(X = 0) &= ? \end{aligned}$$



# Hyper-geometric Random Variable



$$\begin{aligned}N &= 24 \\K &= 4 \\n &= 6 \\k &= 0 \\P(X = 0) &= ?\end{aligned}$$

$$P(X = k) = \frac{\binom{K}{k} \binom{N - K}{n - k}}{\binom{N}{n}}$$

$$P(X = 0) = \frac{\binom{K}{0} \binom{N - K}{n - 0}}{\binom{N}{n}}$$

$$P(X = 0) = \frac{\binom{4}{0} \binom{20}{6}}{\binom{24}{6}}$$

$$P(X = 0) = \frac{\binom{20}{6}}{\binom{24}{6}}$$

$$P(X = 0) = \frac{38\,760}{134\,596} \approx \boxed{0.2879}$$