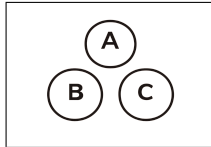
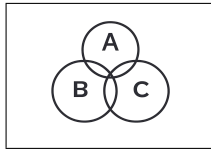


Hyper-geometric Random Variable



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

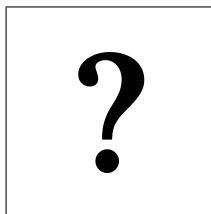


$$P(X = k) = \frac{\binom{K}{k} \binom{N - K}{n - k}}{\binom{N}{n}}$$

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

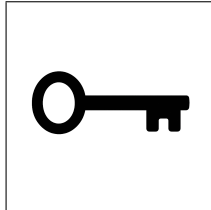
$$E[X] = n \frac{K}{N}$$

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



$$\begin{aligned}N &= 48 \\K &= 30 \\n &= 10 \\P(X \leq 8) &= ?\end{aligned}$$

Hyper-geometric Random Variable



$$\begin{aligned}N &= 48 \\K &= 30 \\n &= 10 \\P(X \leq 8) &= ?\end{aligned}$$

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

$$P(X \leq 8) = \sum_{x=0}^8 P(X = x)$$

$$P(X \leq 8) = \sum_{x=0}^8 \frac{\binom{30}{x} \binom{48 - 30}{10 - x}}{\binom{48}{10}}$$

$$P(X \leq 8) = \sum_{x=0}^8 \frac{\binom{30}{x} \binom{18}{10 - x}}{\binom{48}{10}}$$

$$P(X \leq 8) \approx \boxed{0.9560}$$