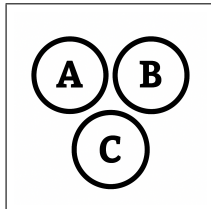
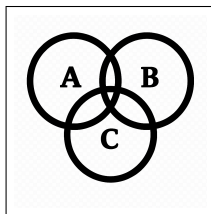


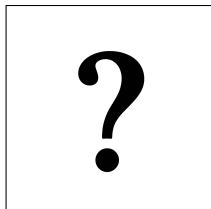
E Discrete Random Variables E



$$\begin{aligned}
 X(HHH) &= 3 \\
 X(HHT) &= 2 \\
 X(HTH) &= 2 \\
 X(THH) &= 2 \\
 X(HTT) &= 1 \\
 X(THT) &= 1 \\
 X(TTH) &= 1 \\
 X(TTT) &= 0
 \end{aligned}$$

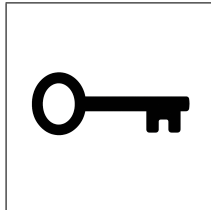


$$\begin{aligned}
 X : \Omega &\rightarrow 0, 1, 2, 3 \\
 P(X = 0) &= \frac{1}{8} \\
 P(X = 1) &= \frac{3}{8} \\
 P(X = 2) &= \frac{3}{8} \\
 P(X = 3) &= \frac{1}{8}
 \end{aligned}$$



$$\begin{aligned}
 P(N = n) &= \frac{1}{(n+1)(n+2)} \quad n \geq 0 \\
 P(N \geq 1 \mid N \leq 4) &= ?
 \end{aligned}$$

E Discrete Random Variables E



$$P(N = n) = \frac{1}{(n+1)(n+2)} \quad n \geq 0$$
$$P(N \geq 1 \mid N \leq 4) = ?$$

$$P(N = n) = \frac{1}{(n+1)(n+2)}$$

$$P(0) = \frac{1}{1 \times 2} = \frac{1}{2}$$

$$P(1) = \frac{1}{2 \times 3} = \frac{1}{6}$$

$$P(2) = \frac{1}{3 \times 4} = \frac{1}{12}$$

$$P(3) = \frac{1}{4 \times 5} = \frac{1}{20}$$

$$P(4) = \frac{1}{5 \times 6} = \frac{1}{30}$$

$$P(N \leq 4) = P(0) + P(1) + P(2) + P(3) + P(4) = \frac{1}{2} + \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} = \frac{5}{6}$$

$$P(1 \leq N \leq 4) = P(1) + P(2) + P(3) + P(4) = \frac{1}{6} + \frac{1}{12} + \frac{1}{20} + \frac{1}{30} = \frac{1}{3}$$

$$P(N \geq 1 \mid N \leq 4) = \frac{P(1 \leq N \leq 4)}{P(N \leq 4)} = \frac{\frac{1}{3}}{\frac{5}{6}} = \frac{1}{3} \cdot \frac{6}{5} = \frac{2}{5} = 0.40$$