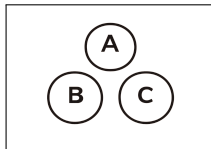


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Bernoulli Trials

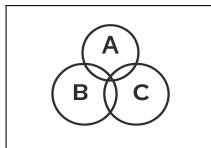
P



$$n = 2$$

$$p = 0.50$$

$$k = 1$$

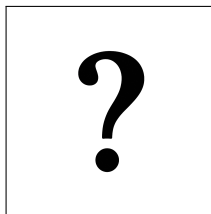


$$P(X = k) = \binom{n}{k} (p)^k (1 - p)^{n-k}$$

$$P(X = 1) = \binom{2}{1} (0.50)^1 (0.50)^1$$

$$P(X = 1) = 2 \times 0.50 \times 0.50$$

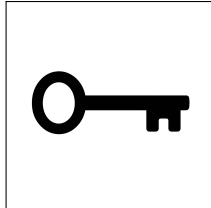
$$P(X = 1) = \boxed{0.50}$$



$$n = 100$$

$$p = 0.02$$

$$P(X = 2 | X \leq 2) = ?$$



$$n = 100$$

$$p = 0.02$$

$$P(X = 2 | X \leq 2) = ?$$

$$P(X = 2 | X \leq 2) = \frac{P(X=2)}{P(X \leq 2)}$$

$$P(X = 2 | X \leq 2) = \frac{P(X=2)}{P(X=0) + P(X=1) + P(X=2)}$$

$$P(X = 0) = (0.98)^{100}$$

$$P(X = 1) = \binom{100}{1} (0.02) (0.98)^{99} = 100 \cdot 0.02 \cdot (0.98)^{99}$$

$$P(X = 2) = \binom{100}{2} (0.02)^2 (0.98)^{98} = 4950 \cdot (0.02)^2 \cdot (0.98)^{98}$$

$$P(X = 0) \approx 0.1329$$

$$P(X = 1) \approx 100 \cdot 0.02 \cdot \frac{0.1329}{0.98} \approx 0.2712$$

$$P(X = 2) \approx 4950 \cdot 0.0004 \cdot \frac{0.1329}{0.98^2} \approx 0.2741$$

$$P(X \leq 2) \approx 0.1329 + 0.2712 + 0.2741 = 0.6782$$

$$P(X = 2 | X \leq 2) \approx \frac{0.2741}{0.6782} \approx \boxed{0.404}$$