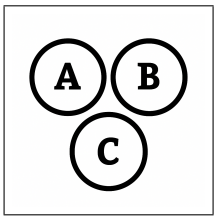
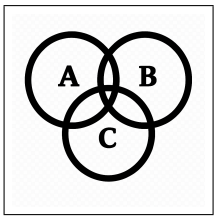
D Bernoulli Trials D



$n = 2$

$p = 0.50$

$k = 1$

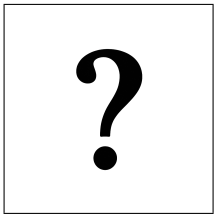


$P(X = k) = \binom{n}{k}(p)^k(1-p)^{n-k}$

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

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

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



$P(H_X) = 1/5$

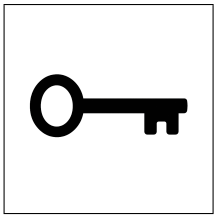
$P(H_O) = 4/5$

$D = 1$

$N = 30$

$P(H_X \mid D) = ?$

D Bernoulli Trials D



$P(H_X) = 1/5$
$P(H_O) = 4/5$
$D = 1$
$N = 30$
$P(H_X \mid D) = ?$

$$P(D \mid H_X) = \binom{30}{1}(0.10)^1(0.90)^{29} = 30 \cdot 0.10 \cdot 0.9^{29}$$
$$P(D \mid H_O) = \binom{30}{1}(0.02)^1(0.98)^{29} = 30 \cdot 0.02 \cdot 0.98^{29}$$
$$P(H_X \mid D) = \frac{P(D|H_X)\,P(H_X)}{P(D|H_X)\,P(H_X) + P(D|H_O)\,P(H_O)}$$
$$P(H_X \mid D) = \frac{\left(\frac{1}{5}\right) 30\,(0.10)\,(0.9)^{29}}{\left(\frac{1}{5}\right) 30\,(0.10)(0.9)^{29} + \left(\frac{4}{5}\right) 30\,(0.02)\,(0.98)^{29}}$$
$$P(H_X \mid D) \approx 0.0957$$