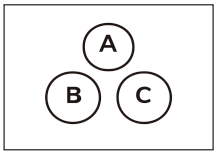
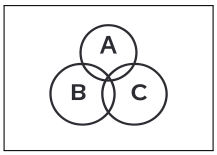
10 Discrete Distribution Posterior Probablities O



$P(H) = 0.30$
$P(L) = 0.70$
$P(A|H) = 0.40$
$P(A|L) = 0.20$

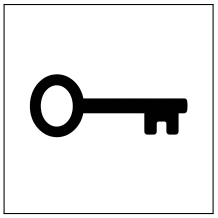


$P(A) = P(A|H)P(H) + P(A|L)P(L)$
$P(A) = (0.4)(0.3) + (0.2)(0.7) = 0.12 + 0.14 = 0.26$

$$P(H|A) = \frac{P(A|H)P(H)}{P(A)} = \frac{(0.4)(0.3)}{0.26} = \frac{0.12}{0.26} = \frac{6}{13} \approx 0.4615$$

$P(A) = 0.60$
$P(S) = 0.30$
$P(N) = 0.10$
$P(X|A) = 0.80$
$P(X|S) = 0.60$
$P(X|N) = 0.40$
$P(A|X) = ?$

10 Discrete Distribution Posterior Probablities O



$P(A) = 0.60$
$P(S) = 0.30$
$P(N) = 0.10$
$P(X|A) = 0.80$
$P(X|S) = 0.60$
$P(X|N) = 0.40$
$P(A|X) = ?$

$$P(X) = P(X|A)P(A) + P(X|S)P(S) + P(X|N)P(N)$$
$$= (0.80)(0.60) + (0.60)(0.30) + (0.40)(0.10)$$
$$= 0.70$$

$$P(A|X) = \frac{P(X|A)P(A)}{P(X)} = \frac{(0.70)(0.60)}{0.70} = 0.69$$