$P[M=a] = 1/4 \qquad P[M=b] = 3/4$

$P[k=k_1] = 1/2 \qquad P[k=k_2] = P[k=k_3] = 1/4$

$$P[C=1] = P[M=a] * P[k=k_1] = \frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$$

$$P[C=2] = P[M=a] * P[k=k_2] + P[M=b] * P[k=k_1]$$

$$= \frac{1}{4} \times \frac{1}{4} + \frac{3}{4} \times \frac{1}{2}$$

$$= \frac{1}{16} + \frac{3}{8} = \frac{7}{16}$$

$$P[C=3] = P[M=a] * P[k=k_3] + P[M=b] * P[k=k_2]$$

$$= \frac{1}{4} \times \frac{1}{4} + \frac{3}{4} \times \frac{1}{4}$$

$$= \frac{4}{16} = \frac{1}{4}$$

$$P[C=4] = P[M=b] * P[k=k_3]$$

$$= \frac{3}{4} \times \frac{1}{4} = \frac{3}{16}$$

$$P[M=a \mid C=1] = \frac{P[M=a] * P[K=K_1]}{P[C=1]} = 1$$

$$P[M=a \mid C=4] = 0$$

$$P[M=a \mid C=2] = \frac{P[M=a] * P[K=K_2]}{P[C=2]} = \frac{\frac{1}{16}}{\frac{1}{16}} = \frac{1}{4}$$

$$P[M=a \mid C=3] = \frac{P[M=a] * P[K=K_3]}{P[C=3]} = \frac{\frac{1}{16}}{\frac{4}{16}} = \frac{1}{4}$$

$$P[M=b \mid C=1] = 0$$

$$P[M=b \mid C=4] = 1$$

$$P[M=b \mid C=2] = \frac{P[M=b] * P[K=K_1]}{P[C=2]} = \frac{\frac{3}{8}}{\frac{1}{16}} = \frac{6}{7}$$

$$P[M=b \mid C=3] = \frac{P[M=b] * P[K=K_2]}{P[C=3]} = \frac{3}{4}$$