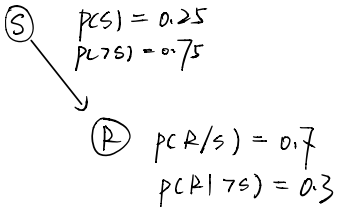
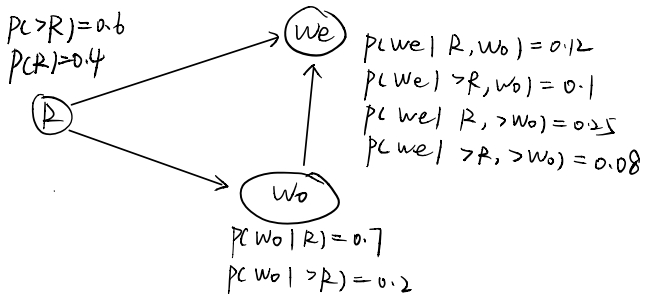
(a) $P(R) = P(S) \cdot P(R|S) + P(\neg S) \cdot P(R|\neg S)$

$= 0.25 \times 0.7 + 0.75 \times 0.3$

$= 0.4$



(b)



$\therefore P(We) = P(We, R, Wo) + P(We, \neg R, Wo) + P(We, R, \neg Wo) + P(We, \neg R, \neg Wo)$

$= P(We|R,Wo) \cdot P(R,Wo) + P(We|\neg R,Wo) \cdot P(\neg R,Wo) + P(We|R,\neg Wo) \cdot P(R,\neg Wo)$

$+ P(We|\neg R,\neg Wo) \cdot P(\neg R,\neg Wo)$

$= P(We|R,Wo) \cdot P(Wo|R) \cdot P(R) + P(We|\neg R,Wo) \cdot P(Wo|\neg R) \cdot P(\neg R)$

$+ P(We|R,\neg Wo) \cdot P(\neg Wo|R) \cdot P(R) + P(We|\neg R,\neg Wo) \cdot P(\neg Wo|\neg R) \cdot P(\neg R)$

$= 0.12 \times 0.7 \times 0.4 + 0.1 \times 0.2 \times 0.6 + 0.25 \times 0.3 \times 0.4 + 0.08 \times 0.8 \times 0.6$

$= 0.114.$

(c) $P(M|S) = \frac{P(M,S)}{P(S)}$

$P(M,S) = P(M,S,R,Wo,We) + P(M,S,\neg R,Wo,We) + P(M,S,R,\neg Wo,We)$

$+ P(M,S,R,Wo,\neg We) + P(M,S,\neg R,\neg Wo,We) + P(M,S,\neg R,Wo,\neg We)$

$+ P(M,S,R,\neg Wo,\neg We) + P(M,S,\neg R,\neg Wo,\neg We)$

$= P(M|We) \cdot P(We|R,Wo) \cdot P(Wo|R) \cdot P(R|S) \cdot P(S)$

$+ P(M|We) P(We|\neg R,Wo) P(Wo|\neg R) P(\neg R|S) \cdot P(S)$

$+ P(M|We) P(We|R,\neg Wo) P(\neg Wo|R) P(R|S) P(S)$

$+ P(M|We) P(We|\neg R,\neg Wo) P(\neg Wo|\neg R) P(\neg R|S) P(S)$

$$+ P(M \mid \neg we)\, P(\neg we \mid R, wo)\, P(wo \mid R)\, P(R \mid S)\, P(S)$$
$$+ P(M \mid \neg we)\, P(\neg we \mid \neg R, wo)\, P(wo \mid \neg R)\, P(\neg R \mid S)\, P(S)$$
$$+ P(M \mid \neg we)\, P(\neg we \mid R, \neg wo)\, P(\neg wo \mid R)\, P(R \mid S)\, P(S)$$
$$+ P(M \mid \neg we)\, P(\neg we \mid \neg R, \neg wo)\, P(\neg wo \mid \neg R)\, P(\neg R \mid S)\, P(S)$$

$$= 0.02 \times 0.12 \times 0.7 \times 0.7 + 0.02 \times 0.1 \times 0.2 \times 0.3 + 0.02 \times 0.25 \times 0.3 \times 0.3 \times 0.7$$
$$+ 0.42 \times 0.88 \times 0.7 \times 0.7 + 0.02 \times 0.08 \times 0.8 \times 0.3 + 0.42 \times 0.9 \times 0.2 \times 0.3$$
$$+ 0.42 \times 0.75 \times 0.3 \times 0.7 + 0.42 \times 0.9 \times 0.8 \times 0.3$$
$$= 0.3654$$

(d) $P(B \mid S) = \dfrac{P(B, S)}{P(S)}$

$$P(B, S) = P(B, S, R, wo) + P(B, S, \neg R, wo) + P(B, S, R, \neg wo) + P(B, S, \neg R, \neg wo)$$
$$= P(B \mid S, wo)\, P(wo \mid R)\, P(R \mid S)\, P(S) + P(B \mid S, wo)\, P(wo \mid \neg R)\, P(\neg R \mid S)\, P(S)$$
$$+ P(B \mid S, \neg wo)\, P(\neg wo \mid R)\, P(R \mid S)\, P(S) + P(B \mid S, \neg wo)\, P(\neg wo \mid \neg R)\, P(\neg R \mid S)\, P(S)$$
$$= 0.8 \times 0.7 \times 0.7 + 0.8 \times 0.2 \times 0.3 + 0.4 \times 0.3 \times 0.7 + 0.4 \times 0.8 \times 0.3$$
$$= 0.62$$

(e) $P(S \mid B, \neg wo) = \dfrac{P(S, B, \neg wo)}{P(B, \neg wo)}$

$$P(S, B, \neg wo) = P(S, B, \neg wo, R) + P(S, B, \neg wo, \neg R)$$
$$= P(B \mid S, \neg wo)\, P(\neg wo \mid R)\, P(R \mid S)\, P(S)$$
$$+ P(B \mid S, \neg wo)\, P(\neg wo \mid \neg R)\, P(\neg R \mid S)\, P(S)$$
$$= 0.4 \times 0.3 \times 0.7 \times 0.25 + 0.4 \times 0.8 \times 0.3 \times 0.25$$
$$= 0.045$$

$$P(B_1 > w_0) = P(B_1, S_1 > w_0, R) + P(B_1, S_1 > w_0, R)$$
$$+ P(B_1, S_1 > w_0, > R) + P(B_1, > S_1, > w_0, > R)$$
$$= P(B|S_1 > w_0) \cdot P(> w_0 | R) \cdot P(R|S) \cdot P(S)$$
$$+ P(B|S_1 > w_0) \cdot P(> w_0 | R) \cdot P(R/>S) \cdot P(>S)$$
$$+ P(B|S_1 > w_0) \cdot P(> w_0 | > R) \cdot P(> R|S) \cdot P(S)$$
$$+ P(B|>S_1 > w_0) \cdot P(> w_0 | > R) \cdot P(> R|S) \cdot P(>S)$$

$$= 0.4 \times 0.3 \times 0.7 \times 0.25 + 0.4 \times 0.3 \times 0.3 \times 0.75 + 0.4 \times 0.8 \times 0.3 \times 0.25$$
$$+ 0.4 \times 0.8 \times 0.7 \times 0.75 = 0.24$$

$$\therefore P(S|B_1 > w_0) = \frac{0.045}{0.24} = 0.1875$$