3.9 (b) $P(S, A=\text{bad}, W=\text{clear})$

$= P(W=\text{clear}) \cdot P(S \mid W=\text{clear}) \cdot P(A=\text{bad} \mid S)$

Then normalize over S, we can get $P(S \mid A=\text{bad}, W=\text{clear})$

4.1 $P(-e,-s,-m,-b) = P(-e)\, P(-s \mid -m,-e)\, P(-m)\, P(-b \mid -m)$

$= 0.6 \times 0.9 \times 0.9 \times 0.9 = 0.4374$

4.2 $P(+b) = \sum_{M} P(+b \mid m)\, P(m) = 0.1 \times 1.0 + 0.9 \times 0.1 = 0.19$

4.3 Join M, we get $P(B, M)$

+m	+b	0.1
+m	-b	0.0
-m	+b	0.09
-m	-b	0.81

so $P(+m \mid +b) = \frac{0.1}{0.1+0.09} = \frac{10}{19}$

4.4 to get $P(+m \mid +s,+b,+e)$, we need $P(M \mid +s,+b,+e)$

$P(+m,+s,+b,+e) = 0.4 \times 0.1 \times 1.0 \times 1.0 = 0.04$

$P(-m,+s,+b,+e) = 0.4 \times 0.9 \times 0.8 \times 0.1 = 0.0288$

so $P(+m \mid +s,+b,+e) = 0.5814$ (normalize)

4.5 E and M is independent, $P(+e \mid +m) = P(+e) = 0.4$

5.1 $f_2(B,D,E,+f,G) = \sum_c P(c \mid B)\, P(D \mid c)\, P(E \mid c,D)\, P(+f \mid c,E)\, P(G \mid c,+f)$

and $f_1(B)$

5.2 $f_3(B,D,+f,G) = \sum_e f_2(B,D,e,+f,G)$ and $f_1(B)$

5.3 $f_4(B,D,+f) = \sum_g f_3(B,D,+f,g)$ and $f_1(B)$

5.4 Join them $f_5(B,D,+f) = f_4(B,D,+f)\, f_1(B)$ then normalize

5.5 f_2 5.6 $(B, f_1(B)) \rightarrow (G, f_2(C,+f)) \rightarrow$

$(E, f_3(C,D,+f)) \rightarrow (C, f_4(B,D,+f))$