

$$P(A, B, C, D, E, F, G) = P(G|E, F)P(F|B, C)P(E|A, B)$$

$$P(D|A)P(A)P(B)P(C)$$

0	.7	b	.5	c	.2
1a	.3	1b	.5	1c	.8

A	B	C	D
T	.8	.2	
F	.3	.7	
E			
F			

A	B	C	D
T	.1	.9	
F	.6	.4	
E			
F			

B	C	D	E
T	.5	.5	
F	.2	.8	
E			
F			

E	F	G	H
T	T	.1	.9
T	F	.4	.6
F	T	.4	.6
F	F	.2	.8

A	B, D, E	4
B	A, C, E, F	16
C	B, F	4
D	A ignore, table have	
E	A, B, F, G	8
F	B, C, E, G	8
G	E, F ignore, table have	

$$D = T \quad G = T$$

$$\begin{array}{ccccc} A & \dots & B & \dots & C \\ \diagdown D & \diagup E & \diagup F & \diagdown G & \text{rules} \\ & & & & P(x) = P(x|y)P(y) \\ & & & & + P(x|z)P(z) \\ & & & & P(x|y) = \frac{P(y|x)P(x)}{P(y)} \end{array}$$

$$P(x, y) = P(x|y)P(y)$$

Tables			
B	E	D	a
T	T	T	.50909
T	F	T	.93333
F	T	T	.80576
F	F	T	.96137

B	F	C
T	T	.38462
T	F	.13514
F	T	.82143
F	F	.14286

A	C	E	F	b
T	T	T	T	.10638
T	T	F	T	.21739
T	T	F	F	.61644
T	F	T	T	.78947
T	F	T	F	.4
T	F	F	T	.4
T	F	F	F	.36
F	T	T	T	.9
F	T	T	F	.32258
F	T	F	T	.32632
F	T	F	F	.70074
F	F	T	T	.86957
F	F	T	F	.14286
F	F	F	T	.72727
F	F	F	F	.5
F	F	F	F	.94118

A	B	F	g	e
T	T	T	.02703	
T	T	F	.01517	
T	F	T	.19814	
T	F	F	.75	
F	T	T	.17489	
F	T	F	.75	
F	F	T	.64231	
F	F	F	.94737	

B	C	E	g	f
T	T	T	T	.2
T	T	F	T	.66667
T	F	T	T	.05882
T	F	F	T	.32468
F	T	T	T	.42257
F	T	F	T	.82353
F	F	T	T	.5
F	F	F	T	.88889

$$P(C|B, F) = P(F, B|C)P(C)/P(F, B)$$

$$\begin{aligned} P(F, B) &\stackrel{?}{=} P(F|B)P(B) \\ &= P(F|B, C)P(B)P(C) \\ &\quad + P(F|B, \neg C)P(B)P(\neg C) \end{aligned}$$

$$P(C|B, F) = \frac{P(F|B, C)P(B)P(C)}{P(F|B, C)P(B)P(C) + P(F|B, \neg C)P(B)P(\neg C)}$$

B	F	C
T	T	.78462
T	F	.13514
F	T	.52143
F	F	.14286

$P(b) = .5 \quad | .5$
 $P(C) = .2 \quad | .8$

$$\begin{aligned} P(c|b, f) &= P(F|b, C)P(b)P(f) / (P(F|b, C)P(b)P(f) + P(F|b, \neg C)P(b)P(\neg f)) \\ &= .5 \cdot .5 \cdot .2 / (.5 \cdot .5 \cdot .2 + .2 \cdot .5 \cdot .8) \\ P(c|b, \neg f) &= P(F|b, C)P(b) / (P(F|b, C)P(b) + P(F|b, \neg C)P(b)) \\ &= .5 \cdot .5 \cdot .2 / (.5 \cdot .5 \cdot .2 + .8 \cdot .5 \cdot .8) \\ P(c|\neg b, f) &= P(F|\neg b, C)P(b) / (P(F|\neg b, C)P(b) + P(F|\neg b, \neg C)P(\neg b)) \\ &= .8 \cdot .5 \cdot .2 / (.8 \cdot .5 \cdot .2 + .7 \cdot .5 \cdot .8) \\ P(c|\neg b, \neg f) &= P(F|\neg b, C)P(b) / (P(F|\neg b, C)P(b) + P(F|\neg b, \neg C)P(\neg b)) \\ &\approx .2 \cdot .5 \cdot .2 / (.2 \cdot .5 \cdot .2 + .3 \cdot .5 \cdot .8) \end{aligned}$$

B	C	F
T	T	.5
T	F	.2
F	T	.8
F	F	.7

$$P(A|B, E, J) = P(J, E, B|A)P(A)/P(B, E, J)$$

$$\begin{aligned} P(E, J, B|A) &= P(E, J|A, B)P(B) \\ &= P(E|A, B)P(J|A, B)P(B) \end{aligned}$$

$$P(B, E, J) = P(E|B)P(B)P(J|B)P(J) = P(E|A, B)P(J|A, B)P(B) + P(E|\neg A, B)P(J|\neg A, B)P(\neg B)$$

$$P(A|B, E, J) = P(E|A, B)P(J|A, B)P(B)P(A) / P(E|A, B)P(J|A, B)P(A)P(J) + P(E|\neg A, B)P(J|\neg A, B)P(\neg B)P(A)$$

B	E	J	A
T	T	T	.50909
T	F	T	.43333
F	T	T	.80576
F	F	T	.46137

$P(A) = .7 \quad | .3$
 $P(B) = .5 \quad | .5$

$$\begin{aligned} P(a|b, e, j) &= P(e|a, b)P(j|a)P(b)P(a) / (P(e|a, b)P(j|a)P(b)P(a)P(b) + P(e|\neg a, b)P(j|\neg a)P(\neg b)P(a)) \\ &= .1 \cdot .8 \cdot .5 \cdot .2 / (.1 \cdot .8 \cdot .7 \cdot .5 + .6 \cdot .3 \cdot .3 \cdot .5) \\ P(a|b, \neg j, \neg e) &= P(\neg e|a, b)P(\neg j|a)P(b)P(a) / (P(\neg e|a, b)P(\neg j|a)P(b)P(a)P(b) + P(\neg e|\neg a, b)P(\neg j|\neg a)P(\neg b)P(a)) \\ &= .9 \cdot .8 \cdot .5 \cdot .7 / (.9 \cdot .8 \cdot .7 \cdot .5 + .4 \cdot .3 \cdot .3 \cdot .5) \\ P(a|\neg b, \neg j, e) &= P(e|\neg a, b)P(j|\neg a)P(b)P(a) / (P(e|\neg a, b)P(j|\neg a)P(b)P(a)P(b) + P(e|\neg a, \neg b)P(j|\neg a)P(\neg b)P(a)P(\neg b)) \\ &= .6 \cdot .8 \cdot .5 \cdot .7 / (.6 \cdot .8 \cdot .7 \cdot .5 + .9 \cdot .3 \cdot .3 \cdot .5) \\ P(a|\neg b, \neg j, \neg e) &= P(\neg e|\neg a, b)P(\neg j|\neg a)P(\neg b)P(a) / (P(\neg e|\neg a, b)P(\neg j|\neg a)P(\neg b)P(a)P(\neg b) + P(\neg e|\neg a, \neg b)P(\neg j|\neg a)P(\neg b)P(\neg b)) \\ &= .4 \cdot .8 \cdot .5 \cdot .7 / (.4 \cdot .8 \cdot .7 \cdot .5 + .1 \cdot .3 \cdot .3 \cdot .5) \end{aligned}$$

A	J	E	B
T	.8	.1	.9
F	.3	.6	.4
F	.6	.1	.4
F	.9	.9	.1

$$P(E|A, B, F, g) = P(F, g|E, A, B)P(E|A, B)P(F|g, A, B)$$

$$\begin{aligned} P(F, g|A, B) &= P(g|A, B, F)P(F|A, B) \\ &= P(g|F, e)P(F|B, C)P(e|A, B)P(C) + P(g|F, \neg e)P(F|B, C)P(\neg e|A, B)P(C) \\ &\quad + P(g|F, e)P(F|B, \neg C)P(e|A, B)P(\neg C) + P(g|F, \neg e)P(F|B, \neg C)P(\neg e|A, B)P(\neg C) \\ P(F, g|E, A, B) &= P(g|A, B, E, F)P(F|A, B, E) \\ &= P(g|E, F)P(F|B, C)P(C) + P(g|E, F)P(F|B, \neg C)P(\neg C) \end{aligned}$$

$$P(E|A, B, F, g) = \frac{P(g|E, F)P(F|B, C)P(C)P(E|A, B) + P(g|E, F)P(F|B, \neg C)P(\neg C)P(E|A, B)}{\left(P(g|F, e)P(F|B, C)P(e|A, B)P(C) + P(g|F, \neg e)P(F|B, C)P(\neg e|A, B)P(C) \right) + \left(P(g|F, e)P(F|B, \neg C)P(e|A, B)P(\neg C) + P(g|F, \neg e)P(F|B, \neg C)P(\neg e|A, B)P(\neg C) \right)}$$

A	B	F	G	E
T	T	T	T	.02703
T	T	F	T	.01517
T	F	T	T	.19814
T	F	F	T	.75
F	T	T	T	.15489

$P(g|e, f)P(F|b, C)P(C)P(e|a, b) + P(g|e, f)P(F|b, \neg C)P(\neg C)P(e|a, b)$
 $= .1 \cdot .5 \cdot .1 \cdot .2 + .1 \cdot .2 \cdot .8 \cdot .1 = .0026$

$P(g|e, f)P(F|b, C)P(e|a, b)P(C) + P(g|e, f)P(F|b, \neg C)P(\neg e|a, b)P(C)$
 $= .1 \cdot .3 \cdot .1 \cdot .2 + .4 \cdot .5 \cdot .9 \cdot .2 = .037$

$P(g|e, f)P(F|b, C)P(e|a, b)P(C) + P(g|e, f)P(F|b, \neg C)P(\neg e|a, b)P(C)$
 $= .1 \cdot .3 \cdot .1 \cdot .8 + .4 \cdot .2 \cdot .9 \cdot .8 = .0592$

$P(g|e, f)P(F|b, C)P(e|a, b) + P(g|e, f)P(F|b, \neg C)P(\neg e|a, b)$
 $= .1 \cdot .3 \cdot .1 \cdot .8 + .4 \cdot .2 \cdot .9 \cdot .8 = .0592$

A	B	e	\neg e
a	.7	.3	.1
b	.5	.5	.6
c	.2	.8	.6
d	.9	.1	.4

B	C	E	\neg E	F	G
T	T	.5	.5	T	.1
T	F	.2	.8	T	.4
F	T	.7	.3	F	.4
F	F	.8	.2	F	.2

$$P(F|B,C,E,g) = \frac{P(g|E,F)P(E|a,B)P(a)P(F|B,C) + P(g|E,F)P(E|a,B)P(\gamma a)P(F|B,C)}{(P(g|E,F)P(E|a,B)P(F|B,C)P(a) + P(g|E,F)P(E|a,B)P(\gamma a)P(F|B,C)P(\gamma a)) + P(g|E,F)P(E|a,B)P(F|B,C)P(\gamma a) + P(g|E,F)P(E|\gamma a,B)P(F|B,C)P(\gamma a))} \quad \begin{array}{c|cc} & T & F \\ \hline A & .7 & .3 \\ B & .5 & .5 \\ C & .2 & .8 \end{array} \quad \begin{array}{c|cc} A & B \\ \hline T & T \\ T & F \\ F & T \\ F & F \end{array} \quad \begin{array}{c|cc} e & \gamma a \\ \hline T & T \\ T & F \\ F & T \\ F & F \end{array}$$

B	C	E	g	F	
T	T	T	T	.2	$P(g e,f)P(e a,b)P(a)P(f b,c) + P(g e,f)P(e \gamma a,b)P(\gamma a)P(f b,c)$
T	T	F	T	.66667	$= .1 \cdot .1 \cdot 7 \cdot .5 + .1 \cdot .6 \cdot 3 \cdot .5 = .0125$
T	F	T	T	.58882	$P(g e,f)P(e a,b)P(f b,c)P(a) + P(g e,f)P(e \gamma a,b)P(\gamma f b,c)P(a)$
T	F	F	T	.32468	$= .1 \cdot .1 \cdot 5 \cdot 7 + .4 \cdot 1 \cdot 3 \cdot 7 = .0175$
F	T	T	T	.42257	$P(g e,f)P(e \gamma a,b)P(f b,c)P(\gamma a) + P(g e,f)P(e \gamma a,b)P(\gamma f b,c)P(\gamma a)$
F	T	F	T	.82353	$= .1 \cdot .6 \cdot 5 \cdot 3 + .4 \cdot 6 \cdot 5 \cdot 3 = .045$
F	F	T	T	.5	$P(g e,f)P(e \gamma a,b)P(a)P(f b,c) + P(g e,f)P(e \gamma a,b)P(\gamma a)P(f b,c)$
F	F	F	T	.88889	$= .4 \cdot 9 \cdot 7 \cdot 5 + .4 \cdot 4 \cdot 3 \cdot 5 = .15$

2 $P(g|e,f)P(e|\gamma a,b)P(a)P(f|b,c)P(\gamma a)P(\gamma f|b,c)P(a)$
 $= .4 \cdot 9 \cdot 5 \cdot 7 + .2 \cdot 9 \cdot 5 \cdot 7 = .189$

3 $P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)(\gamma f|b,c)P(\gamma a)$
 $= .4 \cdot 4 \cdot 5 \cdot 3 + .2 \cdot 4 \cdot 5 \cdot 3 = .036$

$P(g|e,f)P(e|a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c)P(a)$

$= .1 \cdot 1 \cdot 7 \cdot 2 + .1 \cdot 6 \cdot 3 \cdot 2 = .005$

$P(g|e,f)P(e|a,b)P(f|b,c)P(a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a)$

$= .1 \cdot 1 \cdot 2 \cdot 7 + .4 \cdot 1 \cdot 8 \cdot 7 = .0238$

$P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a)$
 $= .1 \cdot 6 \cdot 2 \cdot 3 + .4 \cdot 6 \cdot 8 \cdot 3 = .0612$

$\overline{P(g|e,f)P(e|\gamma a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c)}$
 $= .4 \cdot 9 \cdot 7 \cdot 2 + .4 \cdot 4 \cdot 3 \cdot 2 = .06$

4 $P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a)$
 $= .4 \cdot 9 \cdot 2 \cdot 7 + .2 \cdot 9 \cdot 8 \cdot 7 = .1512$

$P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a)$
 $= .4 \cdot 6 \cdot 2 \cdot 3 + .2 \cdot 4 \cdot 8 \cdot 3 = .0336$

$P(g|e,f)P(e|a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c)$

$= .1 \cdot 6 \cdot 7 \cdot 7 + .1 \cdot 9 \cdot 3 \cdot 7 = .0483$

$P(g|e,f)P(e|a,b)P(f|b,c)P(a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a)$

$= .1 \cdot 6 \cdot 7 \cdot 7 + .4 \cdot 4 \cdot 3 \cdot 7 = .063$

$P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(f|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a)$

$= .1 \cdot 9 \cdot 7 \cdot 3 + .4 \cdot 9 \cdot 3 \cdot 3 = .0513$

$\overline{P(g|e,f)P(e|\gamma a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c)}$
 $= .4 \cdot 4 \cdot 7 \cdot 7 + .4 \cdot 1 \cdot 3 \cdot 7 = .0868$

5 $P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a)$
 $= .4 \cdot 4 \cdot 7 \cdot 7 + .2 \cdot 4 \cdot 3 \cdot 7 = .0952$

$P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a)$

$= .4 \cdot 6 \cdot 7 \cdot 3 + .2 \cdot 1 \cdot 3 \cdot 3 = .0102$

$\overline{P(g|e,f)P(e|a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c)}$
 $= .1 \cdot 6 \cdot 7 \cdot 8 + .1 \cdot 9 \cdot 3 \cdot 8 = .0552$

6 $P(g|e,f)P(e|a,b)P(f|b,c)P(a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a)$
 $= .1 \cdot 6 \cdot 8 \cdot 7 + .4 \cdot 6 \cdot 2 \cdot 7 = .0672$

$$P(g|e, f) P(e|\gamma_0, \gamma_5) P(f|\gamma_5, \gamma_6) P(\gamma_0) + P(g|e, f) P(e|\gamma_0, \gamma_6) P(f|\gamma_6, \gamma_7) P(\gamma_7)$$

$$= .1 \cdot .9 \cdot .8 \cdot .3 + .4 \cdot .9 \cdot .2 \cdot .3 = .0432$$

$$\overline{P(g|\gamma_0, f) P(e|\gamma_0, \gamma_5) P(f|\gamma_5, \gamma_6) P(\gamma_0) P(f|\gamma_6, \gamma_7) P(\gamma_7)}$$

$$= .4 \cdot .4 \cdot .7 \cdot .8 + .4 \cdot .1 \cdot .3 \cdot .8 = .0992$$

8 $P(g|\gamma_0, f) P(e|\gamma_0, \gamma_5) P(f|\gamma_5, \gamma_6) P(\gamma_0) + P(g|\gamma_0, \gamma_6) P(f|\gamma_6, \gamma_7) P(\gamma_7) P(\gamma_0)$

$$= .4 \cdot .4 \cdot .8 \cdot .7 + .2 \cdot .4 \cdot .2 \cdot .7 = .1008$$

$$P(g|\gamma_0, f) P(e|\gamma_0, \gamma_5) P(f|\gamma_5, \gamma_6) P(\gamma_0) P(f|\gamma_6, \gamma_7) P(\gamma_7) P(\gamma_0)$$

$$= .4 \cdot .1 \cdot .8 \cdot .3 + .2 \cdot .1 \cdot .2 \cdot .3 = .0108$$

$$P(B|A, C, E, F) = P(A, C, E, F|B) P(B) / P(A, C, E, F)$$

$$P(A, C, E, F) = P(E, F|A, C) P(A) P(C)$$

$$= P(E, F|A, b, c) P(A) P(b) P(c)$$

$$+ P(E, F|A, \gamma_b, c) P(A) P(\gamma_b) P(c)$$

$$P(A, C, E, F|B) = P(E, F|A, B, C) P(A) P(C)$$

$$P(B|A, C, E, F) = \frac{P(E|A, B) P(F|B, C) P(A) P(B) P(C)}{(P(E|A, b) P(F|b, c) P(A) P(b) P(c)) + P(E|A, \gamma_b) P(F|\gamma_b, c) P(A) P(\gamma_b) P(c)}$$

	T	F	A	B	e	γ_e
A	.7	.3	T	T	.1	.9
B	.5	.5	T	F	.6	.4
C	.2	.8	F	T	.6	.4
			F	F	.9	.1

A	C	E	F	b	
T	T	T	T	.10638	
T	T	T	F	.21739	
T	T	F	T	.61644	
T	T	F	F	.78947	
T	F	T	T	.4	
T	F	T	F	.4	
T	F	F	T	.36	
T	F	F	F	.9	
F	T	T	T	.32258	
F	T	T	F	.52632	
F	T	F	T	.74074	
F	T	F	F	.86957	
F	F	T	T	.14286	
F	F	T	F	.72727	
F	F	F	T	.5	
F	F	F	F	.94118	

$$P(e|a, b) P(f|b, c) P(a) P(b) P(c)$$

$$\approx .1 \cdot .5 \cdot .7 \cdot .5 \cdot .2 = .0035$$

$$P(e|a, b) P(f|b, c) P(a) P(b) P(c) + P(e|\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

$$= .1 \cdot .5 \cdot .7 \cdot .5 \cdot .2 + .6 \cdot .7 \cdot .5 \cdot .2 = .0329$$

$$P(e|a, b) P(f|\gamma_b, c) P(a) P(b) P(c)$$

$$= .1 \cdot .5 \cdot .7 \cdot .5 \cdot .2 = .0035$$

$$P(e|a, b) P(\gamma_{\gamma_b}, c) P(a) P(\gamma_b) P(c) + P(e|\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

$$= .1 \cdot .5 \cdot .7 \cdot .5 \cdot .2 + .6 \cdot .7 \cdot .5 \cdot .2 = .0161$$

$$P(e|\gamma_a, b) P(f|b, c) P(a) P(b) P(c)$$

$$= .9 \cdot .5 \cdot .7 \cdot .5 \cdot .2 = .0315$$

$$P(\gamma_{\gamma_a}, b) P(f|b, c) P(a) P(b) P(c) + P(\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

$$= .9 \cdot .5 \cdot .7 \cdot .5 \cdot .2 + .4 \cdot .7 \cdot .5 \cdot .2 = .0511$$

$$P(\gamma_{\gamma_a}, b) P(\gamma_{\gamma_b}, c) P(a) P(b) P(c)$$

$$= .9 \cdot .5 \cdot .7 \cdot .5 \cdot .2 = .0315$$

$$P(\gamma_a, b) P(\gamma_{\gamma_b}, c) P(a) P(b) P(c) + P(\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

$$= .9 \cdot .5 \cdot .7 \cdot .5 \cdot .2 + .4 \cdot .3 \cdot .7 \cdot .5 \cdot .2 = .0399$$

$$P(e|a, b) P(f|b, c) P(a) P(b) P(c)$$

$$= .1 \cdot .2 \cdot .7 \cdot .5 \cdot .8 = .0056$$

$$P(e|a, b) P(f|b, c) P(a) P(b) P(c) + P(\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

$$= .1 \cdot .2 \cdot .7 \cdot .5 \cdot .8 + .6 \cdot .7 \cdot .5 \cdot .8 = .14$$

$$P(e|a, b) P(\gamma_{\gamma_b}, c) P(a) P(b) P(c)$$

$$= .1 \cdot .8 \cdot .7 \cdot .5 \cdot .8 = .0224$$

$$P(e|a, b) P(f|b, c) P(a) P(b) P(c) + P(e|\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

$$= .1 \cdot .8 \cdot .7 \cdot .5 \cdot .8 + .6 \cdot .2 \cdot .7 \cdot .5 \cdot .8 = .056$$

$$P(\gamma_a, b) P(f|b, c) P(a) P(b) P(c)$$

$$= .9 \cdot 2 \cdot .7 \cdot .5 \cdot .8 = .0504$$

$$P(\gamma_a, b) P(f|b, c) P(a) P(b) P(c) + P(\gamma_a, \gamma_b) P(f|\gamma_b, c) P(a) P(\gamma_b) P(c)$$

- $= .9 \cdot 2 \cdot 7 \cdot 5 \cdot 8 + .4 \cdot 8 \cdot 7 \cdot 5 \cdot 8 = .14$
 8 $\overbrace{P(\gamma_1(a,b)P(\gamma_1(b,c))P(a)P(b)P(c)} \\ = .9 \cdot 8 \cdot 7 \cdot 5 \cdot 8 = .2016$
 $P(\gamma_1(a,b)P(\gamma_1(b,c))P(a)P(b)P(c) + P(\gamma_1(a,\gamma_1(b))P(\gamma_1(b,c))P(a)P(\gamma_1(b))P(c)) \\ = .9 \cdot 8 \cdot 7 \cdot 5 \cdot 8 + .4 \cdot 2 \cdot 7 \cdot 5 \cdot 8 = .224$
 9 $\overbrace{P(\epsilon|\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c)} \\ = .6 \cdot .5 \cdot 3 \cdot 5 \cdot 2 = .009$
 $P(\epsilon|\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c) + P(\epsilon|\gamma_1(a,\gamma_1(b)))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .6 \cdot 5 \cdot 3 \cdot 5 \cdot 2 + .9 \cdot 7 \cdot 3 \cdot 5 \cdot 2 = .0279$
 10 $\overbrace{P(\epsilon|\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c)} \\ = .6 \cdot 5 \cdot 3 \cdot 5 \cdot 2 = .009$
 $P(\epsilon|\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c) + P(\epsilon|\gamma_1(a,\gamma_1(b)))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .6 \cdot 5 \cdot 3 \cdot 5 \cdot 2 + .9 \cdot 7 \cdot 3 \cdot 5 \cdot 2 = .0171$
 11 $\overbrace{P(\gamma_1(\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c)} \\ = .4 \cdot 5 \cdot 3 \cdot 5 \cdot 2 = .006$
 $P(\gamma_1(\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c) + P(\gamma_1(\gamma_1(a,\gamma_1(b))))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .4 \cdot 5 \cdot 3 \cdot 5 \cdot 2 + .1 \cdot 7 \cdot 3 \cdot 5 \cdot 2 = .0081$
 12 $\overbrace{P(\gamma_1(\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c)} \\ = .4 \cdot 5 \cdot 3 \cdot 5 \cdot 2 = .006$
 $P(\gamma_1(\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c) + P(\gamma_1(\gamma_1(a,\gamma_1(b))))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .4 \cdot 5 \cdot 3 \cdot 5 \cdot 2 + .1 \cdot 7 \cdot 3 \cdot 5 \cdot 2 = .0069$
 13 $\overbrace{P(\epsilon|\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c)} \\ = .6 \cdot 2 \cdot 3 \cdot 5 \cdot 8 = .0144$
 $P(\epsilon|\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c) + P(\epsilon|\gamma_1(a,\gamma_1(b)))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .6 \cdot 2 \cdot 3 \cdot 5 \cdot 8 + .9 \cdot 8 \cdot 3 \cdot 5 \cdot 8 = .0008$
 14 $\overbrace{P(\epsilon|\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c)} \\ = .6 \cdot 8 \cdot 3 \cdot 5 \cdot 8 = .0576$
 $P(\epsilon|\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c) + P(\epsilon|\gamma_1(a,\gamma_1(b)))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .6 \cdot 8 \cdot 3 \cdot 5 \cdot 8 + .9 \cdot 2 \cdot 3 \cdot 5 \cdot 8 = .0792$
 15 $\overbrace{P(\gamma_1(\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c)} \\ = .4 \cdot 2 \cdot 3 \cdot 5 \cdot 8 = .0046$
 $P(\gamma_1(\gamma_1(a,b))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(b)P(c) + P(\gamma_1(\gamma_1(a,\gamma_1(b))))P(\epsilon|f_1(b,c))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .4 \cdot 2 \cdot 3 \cdot 5 \cdot 8 + .1 \cdot 8 \cdot 3 \cdot 5 \cdot 8 = .0192$
 16 $\overbrace{P(\gamma_1(\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c)} \\ = .4 \cdot 8 \cdot 3 \cdot 5 \cdot 8 = .0384$
 $P(\gamma_1(\gamma_1(a,b))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(b)P(c) + P(\gamma_1(\gamma_1(a,\gamma_1(b))))P(\gamma_1(f_1(b,c)))P(\gamma_1(a))P(\gamma_1(b))P(c) \\ = .4 \cdot 8 \cdot 3 \cdot 5 \cdot 8 + .1 \cdot 2 \cdot 3 \cdot 5 \cdot 8 = .0408$