

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

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

$$\begin{array}{c|cc} 0 & .7 & b \\ \hline 1a & .3 & 1b \\ \end{array} \quad \begin{array}{c|c} c & .2 \\ \hline 1c & .8 \end{array}$$

$$\begin{array}{c|cc} A & d & d \\ \hline T & .8 & .2 \\ F & .3 & .7 \end{array} \quad \begin{array}{c|cc} A & B & e & f \\ \hline T & T & .1 & .9 \\ T & F & .6 & .4 \\ F & T & .6 & .4 \\ F & F & .9 & .1 \end{array}$$

$$\begin{array}{c|cc} B & C & f & f \\ \hline T & T & .5 & .5 \\ T & F & .2 & .8 \\ F & T & .7 & .3 \\ F & F & .8 & .2 \end{array}$$

$$\begin{array}{c|cc} E & F & g & h \\ \hline T & T & .1 & .9 \\ T & F & .4 & .6 \\ F & T & .4 & .6 \\ F & F & .2 & .8 \end{array}$$

marker blankets

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	

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

$$\begin{array}{c} A \dots B \dots C \\ | \quad \backslash \quad | \\ D \quad E \dots F \\ | \quad \backslash \quad | \\ G \end{array} \quad \begin{array}{l} \text{rules} \\ P(x) = P(x|y)P(y) \\ + P(x|z)y)P(z) \\ P(x|y) = \frac{P(y|x)P(x)}{P(y)} \end{array}$$

Tables

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

A C E F				b
T T	T	T	T	
T T	T	F	F	
T T	F	F	T	
T T	F	F	F	
T F	T	T	T	
T F	T	F	F	
T F	F	T	T	
T F	F	F	F	
F T	T	T	T	
F T	T	F	F	
F T	F	T	T	
F T	F	F	F	
F F	T	T	T	
F F	T	F	F	
F F	F	T	F	
F F	F	F	F	

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

A B F				e
T T T	T	.00613		
T T F	T	.01517		
T F T	T	.19814		
T F F	T	.75		
F T T	T	.17489		
F T F	T	.75		
F F T	T	.64231		
F F F	T	.94737		

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

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

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

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

$$P(C|B, F) = P(F|B, C)P(B)P(C) / P(F|B, C)P(B)P(C) + P(F|B, \neg C)P(B)P(\neg C)$$

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

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

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

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

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

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

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

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

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

$$P(O) = .7 | .3 \\ P(O) = .5 | .5$$

$$\begin{aligned} \begin{array}{c|ccc|c} B & E & J & A & \\ \hline T & T & T & .50909 & P(a|b, e, j) = P(e|a, b)P(j|a)P(b)P(a) / (P(e|a, b)P(j|a)P(b)P(a) + P(e|\neg a, b)P(j|\neg a)P(b)) \\ T & F & T & .43333 & = .1 \cdot .8 \cdot .5 \cdot .2 / (.1 \cdot .8 \cdot .7 \cdot .5 + .6 \cdot .3 \cdot .3 \cdot .5) \\ F & T & T & .80576 & P(a|b, \neg J, e) = P(e|a, b)P(j|a)P(b)P(a) / (P(e|a, b)P(j|a)P(b)P(a) + P(e|\neg a, b)P(j|\neg a)P(b)) \\ F & F & T & .96137 & = .9 \cdot .8 \cdot .5 \cdot .7 / (.9 \cdot .8 \cdot .7 \cdot .5 + .4 \cdot .3 \cdot .3 \cdot .5) \\ \end{array} \\ \begin{array}{c|ccc|c} & & & A & \\ & & & T & .8 \\ & & & F & .3 \\ \hline & & & T & .1 \\ & & & F & .6 \\ & & & T & .6 \\ & & & F & .9 \\ \end{array} \end{aligned}$$

A	B	O	J
T	.1	.9	
F	.6	.4	
T	.6	.4	
F	.9	.1	

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

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

$$= P(g|F, e)P(F|B, C)P(e|A, B)P(C) + P(g|F, \neg e)P(F|B, C)P(\neg e|A, B)P(C)$$

$$+ P(g|F, e)P(F|B, \neg C)P(e|A, B)P(\neg C) + P(g|F, \neg e)P(F|B, \neg C)P(\neg e|A, B)P(\neg C)$$

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

$$= P(g|E, F)P(F|B, C)P(C) + P(g|E, F)P(F|B, \neg C)P(\neg C)$$

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

A	B	e	J
T	.1	.9	
F	.6	.4	
T	.6	.4	
F	.9	.1	

$$\begin{array}{c|ccc|c} A & B & F & G & e \\ \hline T & T & T & T & .00613 \\ T & T & F & T & .01517 \\ T & F & T & T & .19814 \\ T & F & F & T & .75 \\ F & T & T & T & .15489 \end{array}$$

$$\begin{aligned} & P(g|e, f)P(F|b, C)P(C)P(e|a, b) + P(g|e, f)P(F|b, \neg C)P(\neg C)P(e|a, b) \\ & = .1 \cdot .5 \cdot .1 \cdot .2 + .1 \cdot .2 \cdot .8 \cdot .1 = .0026 \\ & P(g|e, f)P(e|b, C)P(e|a, b)P(C) + P(g|e, f)P(F|b, C)P(\neg e|a, b)P(C) \\ & = .1 \cdot .3 \cdot .1 \cdot .2 + .4 \cdot .5 \cdot .9 \cdot .2 = .365 \\ & P(g|e, f)P(e|b, \neg C)P(e|a, b)P(C) + P(g|e, f)P(F|b, \neg C)P(\neg e|a, b)P(C) \\ & = .1 \cdot .2 \cdot .1 \cdot .8 + .4 \cdot .2 \cdot .9 \cdot .8 = .0592 \\ & P(g|e, \neg f)P(F|b, C)P(C)P(e|a, b) + P(g|e, \neg f)P(F|b, \neg C)P(\neg C)P(e|a, b) \\ & = .1 \cdot .2 \cdot .1 \cdot .8 + .4 \cdot .2 \cdot .9 \cdot .8 = .0592 \end{aligned}$$

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

$$\begin{array}{l} F T \vdash \top \\ F F T T \\ F F F T \end{array} \left| \begin{array}{l} .69231 = .4 : 5 : 2 : 1 + .4 : 8 : 8 : 1 = .0296 \\ .94737 P(g|f,e) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 5 : 1 : 2 + .2 : 8 : 9 : 2 = .022 \\ P(g|f,e) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 8 : 1 : 8 + .2 : 8 : 9 : 8 = .1408 \end{array} \right.$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|e,f) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 7 : 2 : 6 + .1 : 8 : 4 : 8 = .034 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,e) P(f|b,c) P(e|a,b) P(c) + P(g|e,e) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 7 : 6 : 2 + .4 : 7 : 4 : 2 = .0308 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,e) P(f|b,c) P(e|a,b) P(c) + P(g|e,e) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 8 : 6 : 8 + .4 : 8 : 4 : 8 = .1408 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|e,f) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 3 : 2 : 6 + .4 : 2 : 8 : 6 = .0528 \end{array} \right)$$

$$4 \quad \left. \begin{array}{l} P(g|f,e) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 3 : 6 : 2 + .2 : 3 : 4 : 2 = .0192 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|f,e) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 2 : 6 : 8 + .2 : 2 : 4 : 8 = .0312 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|e,f) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 5 : 2 : 6 + .1 : 2 : 8 : 6 = .0156 \end{array} \right)$$

$$5 \quad \left. \begin{array}{l} P(g|e,e) P(f|b,c) P(e|a,b) P(c) + P(g|e,e) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 5 : 6 : 2 + .4 : 5 : 4 : 2 = .054 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,e) P(f|b,c) P(e|a,b) P(c) + P(g|e,e) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 2 : 6 : 8 + .4 : 2 : 4 : 8 = .0332 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|e,f) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 5 : 2 : 6 + .4 : 4 : 8 : 6 = .1776 \end{array} \right)$$

$$6 \quad \left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 5 : 6 : 2 + .2 : 3 : 4 : 2 = .032 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 8 : 6 : 8 + .2 : 8 : 4 : 8 = .2048 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|e,f) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 7 : 9 : 2 + .1 : 8 : 8 : 9 = .0702 \end{array} \right)$$

$$7 \quad \left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 7 : 4 : 2 + .4 : 7 : 1 : 2 = .0182 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .1 : 8 : 9 : 8 + .4 : 8 : 1 : 8 = .0832 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|e,f) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 3 : 2 : 9 + .4 : 2 : 8 : 9 = .0792 \end{array} \right)$$

$$8 \quad \left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 3 : 9 : 2 + .2 : 3 : 1 : 2 = .0228 \end{array} \right)$$

$$\left. \begin{array}{l} P(g|e,f) P(f|b,c) P(e|a,b) P(c) + P(g|f,e) P(f|b,c) P(e|a,b) P(c) \\ = .4 : 2 : 9 : 8 + .2 : 2 : 1 : 8 = .0608 \end{array} \right)$$

$$P(F|\beta, \gamma, E, g) = P(E, g|F, \beta, \gamma) P(F|\beta, \gamma) / P(E, g|\beta, \gamma)$$

$$\begin{aligned} P(E, g|F, \beta, \gamma) &= P(g|E, F, \beta, \gamma) P(E|F, \beta, \gamma) \\ &= P(g|E, F) P(E|a, \beta) P(g) + \\ &\quad P(g|E, F) P(E|a, \beta) P(a) \end{aligned}$$

$$P(E, g|\beta, \gamma) = P(g|E, F) P(E|a, \beta) P(F|\beta, \gamma)$$

$$\begin{aligned} &+ P(g|E, F) P(E|a, \beta) P(F|\beta, \gamma) P(a) \\ &+ P(g|E, F) P(E|a, \beta) P(F|\beta, \gamma) P(a) \\ &+ P(g|E, F) P(E|a, \beta) P(F|\beta, \gamma) P(a) \end{aligned}$$

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

$$\begin{array}{c|ccccc} B & C & E & g & F \\ \hline T & T & T & T & .2 \\ T & T & F & T & .66667 \\ T & F & T & T & .58882 \\ T & F & F & T & .32468 \\ F & T & T & T & .42257 \\ F & T & F & T & .82353 \\ F & F & T & T & .5 \\ F & F & F & T & .88889 \end{array} \quad \begin{array}{l} P(g|e,f)P(e|a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c) \\ = .1 \cdot .1 \cdot 7 \cdot .5 + .1 \cdot .6 \cdot 3 \cdot .5 = .0125 \\ P(g|e,f)P(e|a,b)P(f|b,c)P(a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a) \\ = .1 \cdot .1 \cdot 5 \cdot 7 + .4 \cdot 1 \cdot 3 \cdot 7 = .0175 \\ P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .1 \cdot .6 \cdot 5 \cdot 3 + .4 \cdot 6 \cdot 5 \cdot 3 = .045 \\ P(g|e,f)P(e|\gamma a,b)P(a)P(f|b,c) + P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c) \\ = .4 \cdot 9 \cdot 7 \cdot 5 + .4 \cdot 4 \cdot 3 \cdot 5 = .15 \\ P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a) \\ = .4 \cdot 9 \cdot 5 \cdot 7 + .2 \cdot 9 \cdot 5 \cdot 7 = .189 \end{array} \quad \begin{array}{c|cc} B & C \\ \hline T & T \\ T & F \\ F & T \\ F & F \end{array} \quad \begin{array}{c|cc} f & \gamma f \\ \hline T & S \\ T & .5 \\ F & .2 \\ F & .8 \\ F & T \\ F & F \end{array} \quad \begin{array}{c|cc} E & F \\ \hline T & T \\ T & F \\ F & T \\ F & F \end{array} \quad \begin{array}{c|cc} g \\ \hline T & .1 \\ T & .4 \\ F & .4 \\ F & .2 \end{array}$$

$$2 \quad \begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(\gamma a)P(f|b,c)P(\gamma a)P(f|b,c)P(\gamma a) \\ = .4 \cdot 9 \cdot 5 \cdot 7 + .2 \cdot 9 \cdot 5 \cdot 7 = .036 \end{array}$$

$$\begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .1 \cdot 1 \cdot 7 \cdot 2 + .1 \cdot 6 \cdot 3 \cdot 2 = .005 \end{array}$$

$$3 \quad \begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .1 \cdot 1 \cdot 2 \cdot 7 + .4 \cdot 1 \cdot 8 \cdot 7 = .0238 \\ P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .1 \cdot 6 \cdot 2 \cdot 3 + .4 \cdot 6 \cdot 8 \cdot 3 = .0612 \end{array}$$

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

$$4 \quad \begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a) \\ = .4 \cdot 9 \cdot 2 \cdot 7 + .2 \cdot 9 \cdot 8 \cdot 7 = .1512 \end{array}$$

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

$$\begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a) \\ = .1 \cdot 6 \cdot 7 \cdot 7 + .1 \cdot 9 \cdot 3 \cdot 7 = .0483 \end{array}$$

$$5 \quad \begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .1 \cdot 6 \cdot 7 \cdot 7 + .4 \cdot 4 \cdot 3 \cdot 7 = .063 \end{array}$$

$$\begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(f|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .1 \cdot 9 \cdot 7 \cdot 3 + .4 \cdot 9 \cdot 3 \cdot 3 = .0513 \end{array}$$

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

$$6 \quad \begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a) \\ = .4 \cdot 4 \cdot 7 \cdot 7 + .2 \cdot 4 \cdot 3 \cdot 7 = .0952 \end{array}$$

$$\begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(\gamma a) \\ = .4 \cdot 1 \cdot 7 \cdot 3 + .2 \cdot 1 \cdot 3 \cdot 3 = .0102 \end{array}$$

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

$$7 \quad \begin{array}{l} P(g|e,f)P(e|\gamma a,b)P(f|b,c)P(\gamma a) + P(g|e,f)P(e|\gamma a,b)P(\gamma f|b,c)P(a) \\ = .1 \cdot 6 \cdot 8 \cdot 7 + .4 \cdot 6 \cdot 2 \cdot 7 = .0672 \end{array}$$

$$P(g|e, f) P(e|\gamma_0, \gamma_5) P(f|\gamma_5, \gamma_6) P(\gamma_0) + P(g|e, f) P(e|\gamma_0, \gamma_6) P(f|\gamma_6, \gamma_7) P(\gamma_4)$$

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

$$\overline{P(g|\gamma_0, f) P(\gamma_0|\gamma_1, \gamma_2) P(g|\gamma_1, \gamma_2) P(f|\gamma_2, \gamma_3) + P(g|\gamma_0, f) P(\gamma_0|\gamma_1, \gamma_2) P(f|\gamma_1, \gamma_3)}$$

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

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$$P(g|\gamma_0, f) P(\gamma_0|\gamma_1, \gamma_2) P(f|\gamma_1, \gamma_2) P(g|\gamma_1, \gamma_2) P(\gamma_1|\gamma_2, \gamma_3) P(f|\gamma_2, \gamma_3) P(g|\gamma_3)$$

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

$$P(g|\gamma_0, f) P(\gamma_0|\gamma_1, \gamma_5) P(f|\gamma_1, \gamma_5) P(g|\gamma_1, \gamma_5) P(\gamma_1|\gamma_5, \gamma_6) P(f|\gamma_5, \gamma_6) P(g|\gamma_6)$$

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

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

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

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

$$+ P(E, F|A, \gamma b, C) P(A) P(\gamma b) P(C)$$

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

$$P(B|A, C, E, F) = \frac{P(E|A, B) P(F|B, C) P(A) P(B) P(C)}{\left( P(E|A, b) P(F|b, C) P(A) P(b) P(C) + P(E|A, \gamma b) P(F|\gamma b, C) P(A) P(\gamma b) P(C) \right)}$$