CS 161 HW #7

1. Generalized Product Rule:

So,

Generalized Bayes’ Rule:

So,

2.

) = (0.9\*0.5) + (0.3\*0.2) + (0.1\*0.3) = 0.51

3.

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | Pr |
| False | False | False | 0.08 |
| False | False | True | 0.08 |
| False | True | False | 0 |
| False | True | True | 0.15 |
| True | False | False | 0.23 |
| True | False | True | 0 |
| True | True | False | 0 |
| True | True | True | 0.46 |

4a.

I(A, 0, BE)

I(B, 0, AC)

I(C, A, DBE)

I(D, AB, CE)

I(E, B, ACDFG)

I(F, CD, ABE)

I(G, F, ABCDEH)

I(H, FE, ABCDG)

4b.

i) false, since H is an open valve (It is convergent, and instantiated).

ii) false, because F, C, A, D, and B are open valves that connect G and E.

iii) false, because E is an open sequential valve.

4c.

Pr(a, b, c, d, e, f, g, h) = Pr(a)Pr(b)Pr(c|a)Pr(d|ab)Pr(e|b)Pr(f|cd)Pr(g|f)Pr(h|ef)

4d.

Pr(A = 0, B = 0) = Pr(A) \* Pr(B) = 0.8 \* 0.3 = 0.24

Pr(E = 1 | A =1) = Pr(E = 1) since E and A are marginally independent.

Pr(E = 1 | A = 1) = Pr(E = 1) = Pr(E | B)\*Pr(B) + Pr(E|~B)\*Pr(~B)= (0.1)\*(0.7) + (0.9)\*(0.3) = 0.07+0.27 = 0.34