1. P(Gun)=0.02

P(Coin)=0.3

P(Nothing)=0.68

P(Beep | Gun)=0.95

P(Beep | Coin)=0.8

P(Beep | Nothing)=0.25

Items(Gun, Coin, Nothing)

= P(Gun) \* P(Beep | Gun) + P(Coin)\* P(Beep | Coin) + P(Nothing)\* P(Beep | Nothing)

=0.02\*0.95 + 0.3\*0.8+0.68\*0.25

=0.429

P(Gun | Beep) = P(Beep | Gun)\* P(Gun) / P(Beep)

= 0.95\*0.02 / 0.429

=0.044289

* 1. P(B | A) P(C | A ) P( D |A) P( E | A, D) P(F | D) P(G|B, C ,E, F)

Graphical user interface, application

Description automatically generated

* 1. 105-1 Rows will be needed
  2. We would need 221 rows as P(A) needs one row, P(D | C) and P(B|A) need 10 rows each so 20 rows, P(C| A, B) and P(E|C,D) need 100 rows each so 200 rows. 200+20+1 is 221, hence 221 rows.
  3. Query P(B|G , E)

Order G, E, A , B, C, D, F

Initial factors: F1(A),F2(B,A), F3(C,A,B), F4(D,A,C), F5(E,A,D), F6(F,A,E), F7(G,B,C)

Eliminating G via conditioning: F8 (B,C)= F7(G,B,C) given that G= True(Assuming True/False Values)

Eliminating E via conditioning: F9(A,D)= F5(E,A,D)

F10(F,A)=F6(F,A,E), given E=True

Eliminating A via summation: F11(B,C,D,F)=∑ F9(F,A,D) F10(F,A )F1(A) F2(B,A)F3(C,A,B)F4(D,A,C) for all A values

Eliminating C via summation: F12(B,D,F)=∑ F11(B,C,D,F) for all C values

Eliminating D via summation: F13(B,F)=∑ F12(B,D,F)for all D values

Eliminating F via summation: F14(B)=∑ F13(B,F) for all F values

Normalize F14(B)🡪 F14(B)/(∑ F14(B) for all values of B) to give us the query(B)

* 1. Query P(B|G , E)

Order G, E, F,D,C,B, A

Initial factors: F1(A),F2(B,A), F3(C,A,B), F4(D,A,C), F5(E,A,D), F6(F,A,E), F7(G,B,C)

Eliminating G via conditioning: F8 (B,C)= F7(G,B,C) given that G= True(Assuming True/False Values)

Eliminating E via conditioning: F9(A,D)= F5(E,A,D)

F10(F,A)= F6(F,A,E), given E=True

Eliminating F via summation: F11(A)=∑ F10(F,A) for all F values

Eliminating D via summation: F12(A,C)=∑ F9(A,D) F4(D,A,C) for all D values

Eliminating C via summation: F13(A,B)=∑ F12(A,C) F8(B,C) F3(C,A,B)for all C values

Eliminating A via summation: F14(B)=∑ F12(A,B) F1(A) F11(A)F2(A,B)for all A values

Normalize F14(B)🡪 F14(B)/(∑ F14(B) for all values of B) to give us the query(B)

* 1. The 2nd order of variables is the faster one as we have less computations done with our second order of eliminations(26) rather than the first one (52)



A picture containing graphical user interface

Description automatically generated

* 1. Factorization: P(L), P(B | L) P(R | L ) P( T |B,R)
  2. P(T=High|B=Many)=

A picture containing diagram

Description automatically generated

* 1. P Hat(T=High| do(B=Many)=