B551: ELEMENTS OF ARTIFICIAL INTELLIGENCE

PROGRAMMING ASSIGNMENT 2

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1. Query: Given Alarm False infer Burglary being true.
   P(B|A=F)

Num Samples	*Prior Sampling*	*Rejection Sampling*	*Likelihood Weighting*
10	0.0	0.0	0.0
50	0	0.0	$1.224 * 10^{-4}$
100	0.0	0.0	0.0
200	0.0	0.0	$3.0171 * 10^{-5}$
500	0.0	0.0	$7.2281 * 10^{-5}$
1000	0.0	0.0001001	$5.4194 * 10^{-5}$
10000	$3.007 * 10^{-5}$	$5.012 * 10^{-5}$	$6.1962 * 10^{-4}$
EXACT	0.001		

2. Query: Given Alarm False infer John Calls being true.
   P(J|A=F)

Num Samples	*Prior Sampling*	*Rejection Sampling*	*Likelihood Weighting*
10	0.079999	0.069999	0.03
50	0.05032	0.03408	0.049667
100	0.03903	0.05608	0.048054
200	0.049250	0.049098	0.0446027
500	0.049568	0.051318	0.05027
1000	0.04995	0.053847	0.050560
10000	0.049453	0.049250	0.050899
EXACT	0.05		

3. Query: Given John calls is true and Earthquake is false infer Burglary.
   P(B|J = T ,E=F)

Num Samples	*Prior Sampling*	*Rejection Sampling*	*Likelihood Weighting*
10	0.05	0.0	0.0

50	0.0	0.03333	0.0268
100	0.034285	0.05	0.0153
200	0.01111	0.0	0.01598
500	0.016328	0.01768	0.023615
1000	0.02135	0.007687	0.010502
10000	0.0161502	0.014912	0.01792098

4. Query: Given John calls is true and Earthquake is false infer Mary calls true.
   P(M|J = T ,E=F)

Num Samples	*Prior Sampling*	*Rejection Sampling*	*Likelihood Weighting*
10	0.0	0.0	0.0
50	0.025	0.0125	0.00199
100	0.0.4555	0.0	0.021948
200	0.0225	0.0467	0.016255
500	0.017911	0.0396277	0.0293029
1000	0.03086	0.05085	0.019488
10000	0.03217	0.031112	0.0472536

5. Query: Given Mary calls is true and John calls is false infer Earthquake true.
   P(E|M = T ,J=F)

Num Samples	*Prior Sampling*	*Rejection Sampling*	*Likelihood Weighting*
10	0.0	0.0	0.0
50	0.0	0.0	0.00199
100	0.0	0.0	0.0098
200	0.0	0.0	0.0177
500	0.01666666	0.0	0.00977
1000	0.01428571	0.0090909	0.00788
10000	0.0084878	0.00535357	0.00595

6. Query: Given Mary calls is true and John calls is false infer Burglary true.
   P(B|M = T ,J=F)

Num Samples	*Prior Sampling*	*Rejection Sampling*	*Likelihood Weighting*
10	0.0	0.0	0.04501

50	0.0	0.0	0.0
100	0.0	0.0	0.0
200	0.0	0.0	0.0103
500	0.0	0.0	0.005749
1000	0.01428571	0.007142	0.00794
10000	0.006586	0.006266	0.008919