Programming Assignment 2

1. Alarm is false, infer Burglary and John Calls being true.
   a. Alarm is false, infer Burglary being true

Num Samples	Prior Sampling	Rejection Sampling	LW
10	0	0	0
50	0	0	0
100	0	0	0
200	0.00025	0.00025	0.0001
500	0	0.0001	4*e-05
1000	5.00500500501e-05	5e-05	0.000353383800359
10000	0.000200440970134	0.000150220485067	0.000126226762854
Exact(Enumeration)	6.01313169715e-05	6.01313169715e-05	6.01313169715e-05

   b. Alarm is false, infer John Calls being true

Num Samples	Prior Sampling	Rejection Sampling	LW
10	0.07	0.045	0.0666666666667
50	0.04	0.048	0.0533333333333
100	0.05	0.05	0.0566666666667
200	0.05	0.05	0.0466666666667
500	0.050511256807	0.0543	0.0500696844413
1000	0.0441323971916	0.0480661985958	0.0520992387706
10000	0.0507217321572	0.0506108660786	0.0498897418035
Exact(Enumeration)	0.05	0.05	0.05

2. John Calls is true, Earthquake is false, infer Burglary and Mary Calls being true.
    a. John Calls is true, Earthquake is false, infer Burglary is true

Num Samples	Prior Sampling	Rejection Sampling	LW
10	0	0.005	0.0333333333333
50	0	0.01	0.00666666666667
100	0.0005	0.005	0.00333333333333
200	0.00175125628141	0.0025	0.00166666666667
500	0.00110220924747	0.0100040160643	0.00666934404284
1000	0.00200400801603	0.00700200400802	0.00466800267201
10000	0.00110231486121	0.00910126227209	0.00864511925218
Exact(Enumeration)	0.0164381492851	0.0164381492851	0.0164381492851

    b. John Calls is true, Earthquake is false, infer Mary Calls is true

Num Samples	Prior Sampling	Rejection Sampling	LW
10	0.1	0.15	0.1
50	0.12	0.09	0.113333333333
100	0.14	0.12	0.0933333333333
200	0.11	0.11	0.10712749616
500	0.100401606426	0.102200803213	0.108752824321
1000	0.0840840840841	0.108042042042	0.102182075881
10000	0.109830644353	0.115065322177	0.117465714185
Exact(Enumeration)	0.120272942981	0.120272942981	0.120272942981

3. Mary Calls is true and John Calls is false, infer Burglary and Earthquake being true.
    a. Mary Calls is true and John Calls is false, infer Burglary being true.

Num Samples	Prior Sampling	Rejection Sampling	LW
10	0	0	0
50	0	0.01	0.00493827160494
100	0	0.005	0.00246262093228
200	0.00185185185185	0.005	0.00456302151954
500	0.00696755406092	0.001	0.000666666666667
1000	0.00593748114225	0.0005	0.000824949521552
10000	0.00680519207617	0.00381053159478	0.00286870972264
Exact(Enumeration)	0.00075312505145	0.00075312505145	0.00075312505145

b. Mary Calls is true and John Calls is false, infer Earthquake being true.

Num Samples	Prior Sampling	Rejection Sampling	LW
10	0	0	0
50	0	0.02	0133333333333
100	0	0.01	0.00246262093228
200	0	0.0025	0.00166666666667
500	0.003171534348	0.001	0.000666666666667
1000	0.0045791709019	0.0005	0.00124657534247
10000	0.00567107750473	0.00388553875236	0.00288174059706
Exact(Enumeration)	0.00184824500035	0.00184824500035	0.00184824500035