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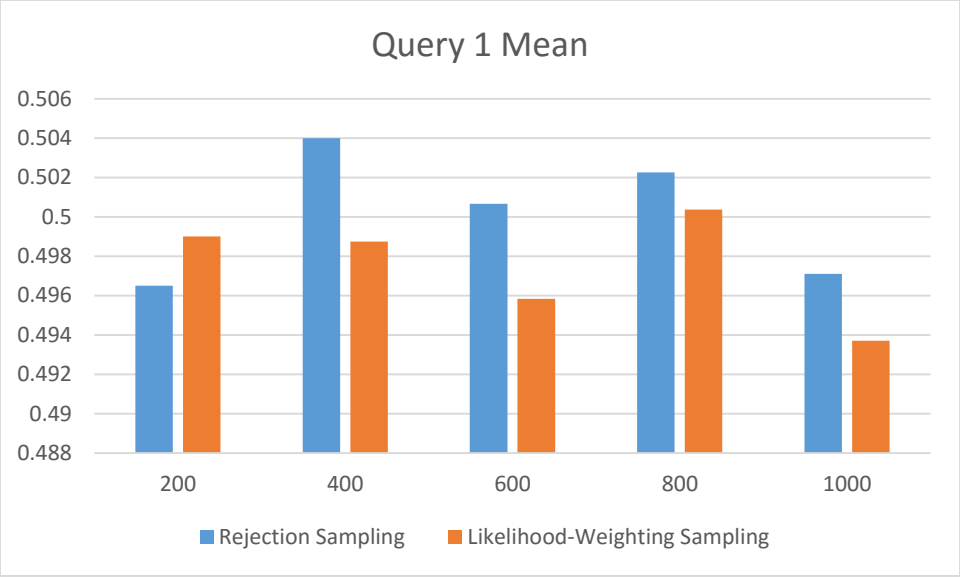
Project 6 Bayesian Networks Write-Up

Network Option B Results:

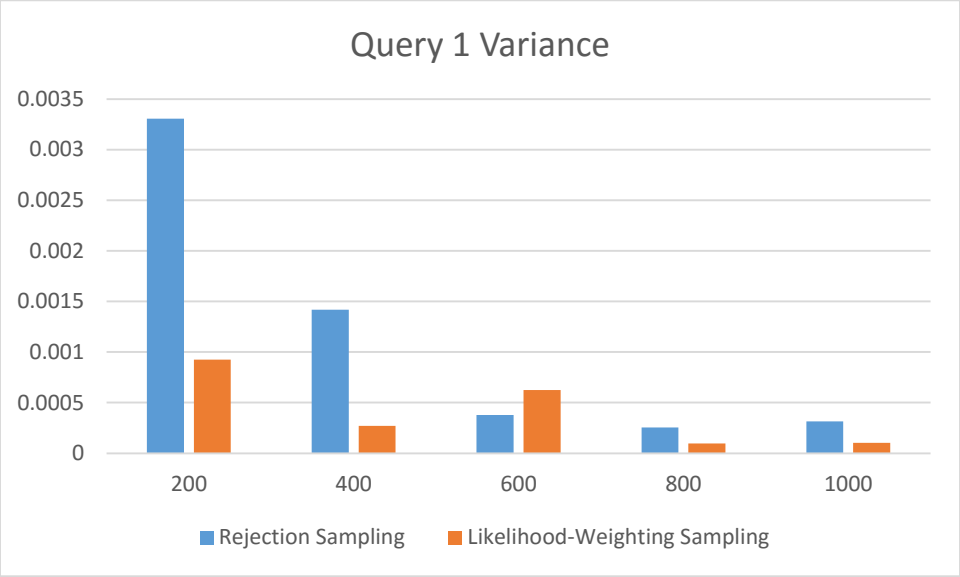
Both queries converged as the number of samples increased. In general, the Likelihood-Weighting function converged faster than the Rejection sampling method. We hypothesize that the use of evidence variables, and less randomness allows more accurate samples and a more accurate results. As can be observed in both variance graphs, the variance for the smallest number of samples for Likelihood Weighting starts off significantly lower than the variance of rejection sampling.

Query 1 Mean:



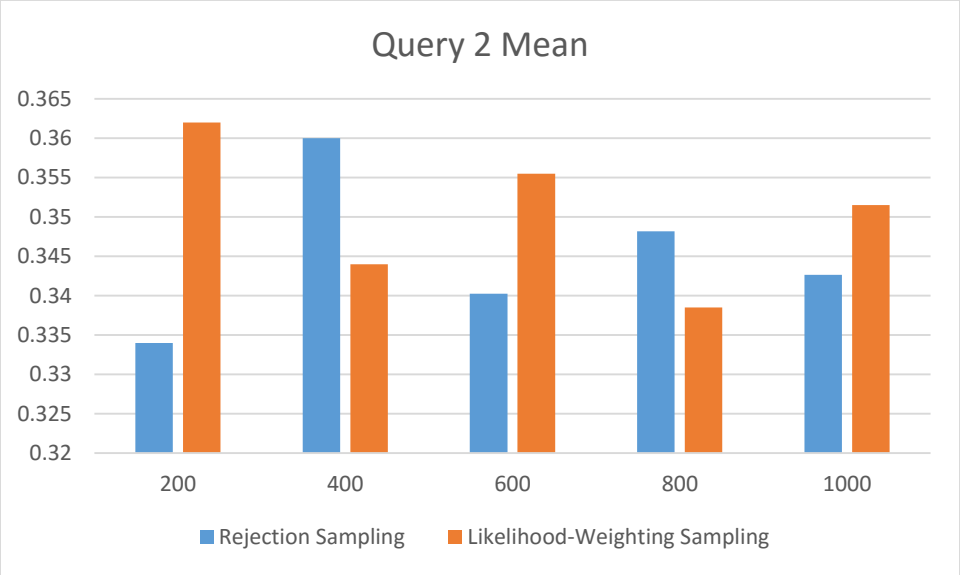
Samples	200	400	600	800	1000
Rejection Sampling	0.4965	0.504	0.500667	0.50225	0.4971
Likelihood-Weighting	0.499	0.49875	0.495833	0.500375	0.4937

Query 1 Variance:



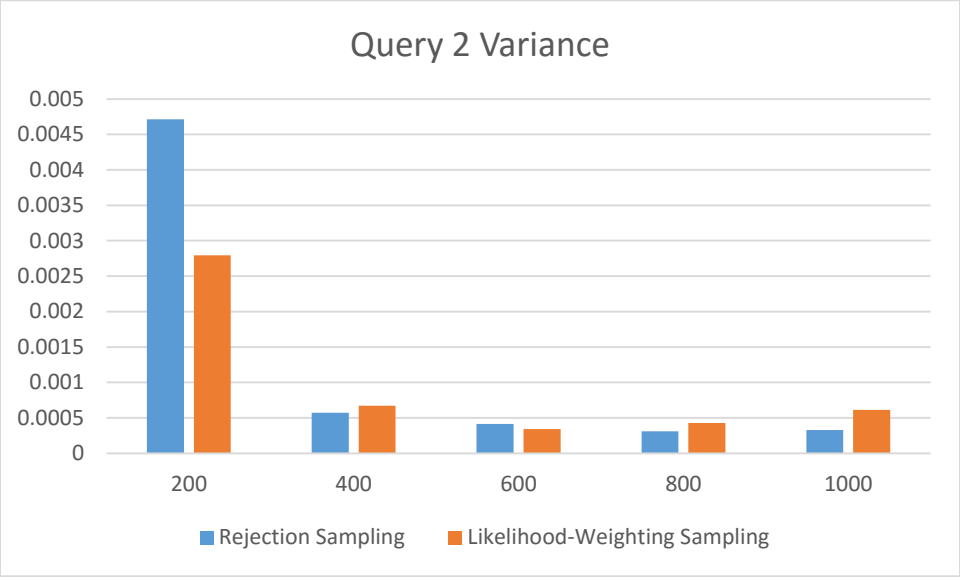
Samples	200	400	600	800	1000
Rejection Sampling	0.003306	0.00142	0.000379	0.000256	0.000314
Likelihood-Weighting	0.000927	0.00027	0.000625	9.65E-05	0.000102

Query 2 Mean:



Samples	200	400	600	800	1000
Rejection Sampling	0.3485	0.3545	0.335	0.3485	0.3491
Likelihood-Weighting	0.339	0.34375	0.363833	0.351125	0.3441

Query 2 Variance:



Samples	200	400	600	800	1000
Rejection Sampling	0.00125	0.000596	0.000314	0.000161	9.23E-05
Likelihood-Weighting	0.00066	0.000356	0.000314	0.000139	0.000205