Bayesian Network Analysis

For our project we utilized Python version 2.7 to create a program to build and analyze a Bayesian Network. The network was analyzed using both a rejection sampling method and a likelihood-weighting method, and we then compared these two methods.

The following data was collected from option A using query 1

Rejection Sampling

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # of Samples | 200 | 400 | 600 | 800 | 1000 |
| Trial 1 | 0.7900 | 0.7975 | 0.7983 | 0.7675 | 0.7570 |
| Trial 2 | 0.7800 | 0.7775 | 0.7617 | 0.7500 | 0.7540 |
| Trial 3 | 0.8300 | 0.7475 | 0.7833 | 0.7713 | 0.7760 |
| Trial 4 | 0.7750 | 0.7225 | 0.8050 | 0.7938 | 0.7570 |
| Trial 5 | 0.7650 | 0.8100 | 0.7783 | 0.7750 | 0.8010 |
| Trial 6 | 0.8000 | 0.7650 | 0.7600 | 0.7388 | 0.7840 |
| Trial 7 | 0.7950 | 0.7925 | 0.7800 | 0.7413 | 0.7580 |
| Trial 8 | 0.8050 | 0.7500 | 0.7450 | 0.7713 | 0.7840 |
| Trial 9 | 0.7450 | 0.7575 | 0.7467 | 0.7400 | 0.7670 |
| Trial 10 | 0.7300 | 0.7550 | 0.7950 | 0.7688 | 0.7680 |
| Mean | 0.7815 | 0.7675 | 0.7753 | 0.7618 | 0.7706 |
| Variance | 0.00086694 | 0.00071389 | 0.00044993 | 0.000336 | 0.00023738 |

The following data was collected from option A using query 1

Rejection Sampling

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| # of Samples | 200 | 400 | 600 | 800 | 1000 |
| Trial 1 | 1 | 1 | 1 | 1 | 1 |
| Trial 2 | 1 | 1 | 1 | 1 | 1 |
| Trial 3 | 1 | 1 | 1 | 1 | 1 |
| Trial 4 | 1 | 1 | 1 | 1 | 1 |
| Trial 5 | 1 | 1 | 1 | 1 | 1 |
| Trial 6 | 1 | 1 | 1 | 1 | 1 |
| Trial 7 | 1 | 1 | 1 | 1 | 1 |
| Trial 8 | 1 | 1 | 1 | 1 | 1 |
| Trial 9 | 1 | 1 | 1 | 1 | 1 |
| Trial 10 | 1 | 1 | 1 | 1 | 1 |
| Mean | 1.0000 | 1.0000 | 1.0000 | 1.0000 | 1.0000 |
| Varience | 0 | 0 | 0 | 0 | 0 |