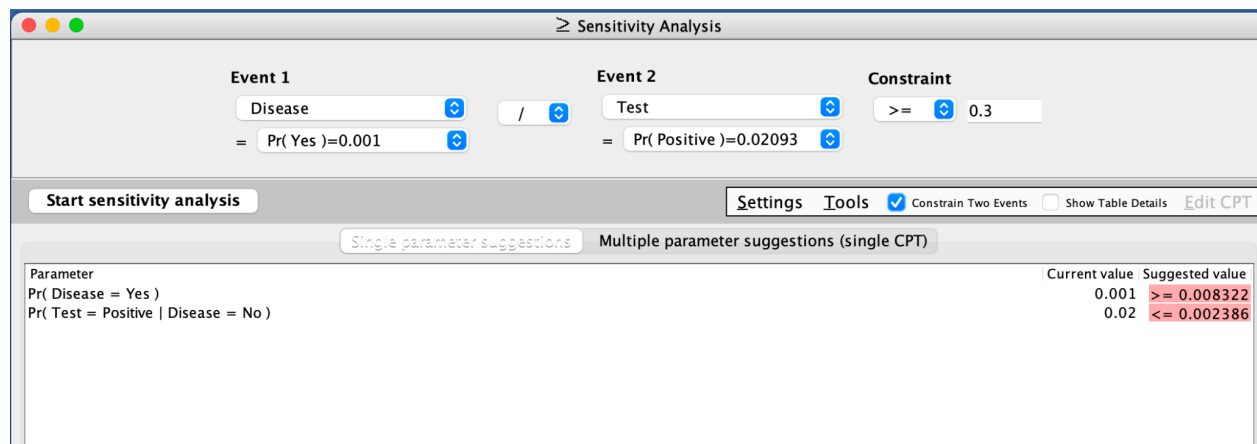
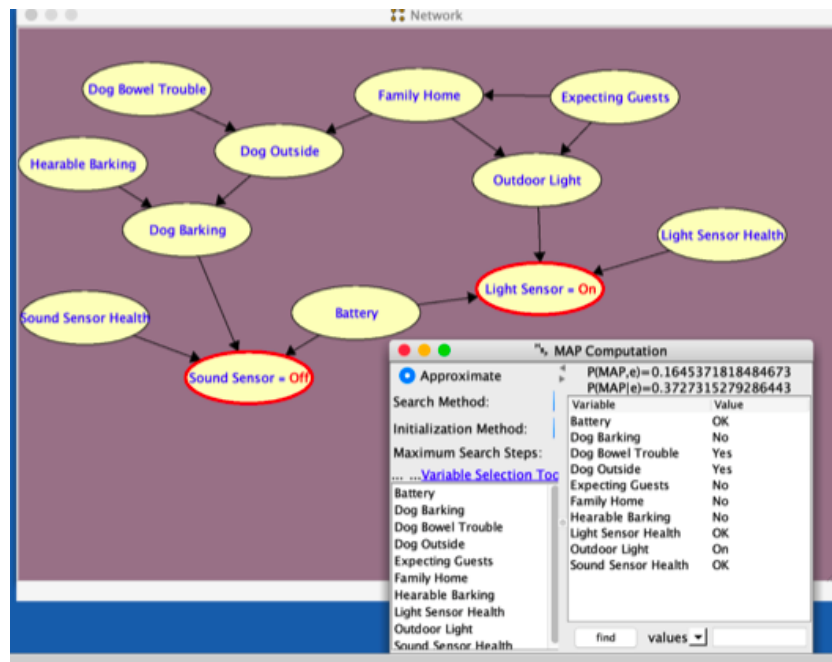


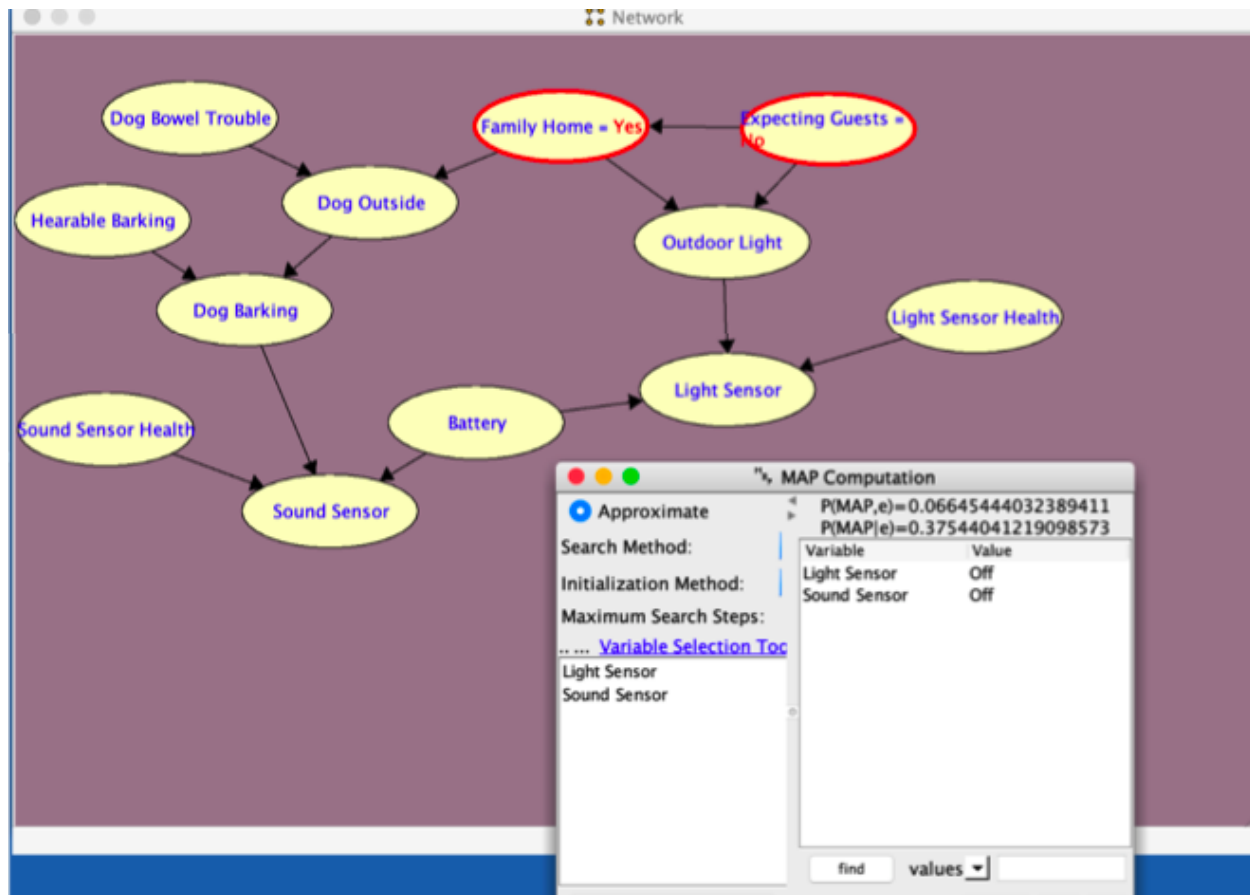
1. The following sensitivity analysis down below is not displaying something for a false negative due to the fact that changing the probability for a false negative itself would not satisfy the constraint.



2.



- The above picture is for when the most likely instantiation of all variables given that Sambot has sensed the lights to be on, but has sensed no bark. To do this, I used the Expectation Maximization algorithm on the original sambot file that was provided to us, then I was able to utilize the MPE algorithm for the remainder of the variables.



- The next picture above is for when the most likely instantiation of the sensors given that the family is home and no guests are expected. To do this, I used the Expectation Maximization algorithm on the original sambot file that was provided to us, then I was able to utilize the MPE algorithm for the remainder of the variables.
- The smallest set of variables Z in my network such that the two sensors are independent given Z are Light Sensor Health and Outdoor Light. Since there are sequential values present, they end up closing these and since the valves are blocked (because they are in Z), then the paths are all blocked and therefore both sensors are independent with d-separation.
- This particular Bayesian network is a multiply-connected network where there exists ≥ 1 pair of nodes with > 1 path. Outdoor Light has Expecting Guests going to it and then it can follow up by going to OutdoorLight, but first must go to Family Home before.