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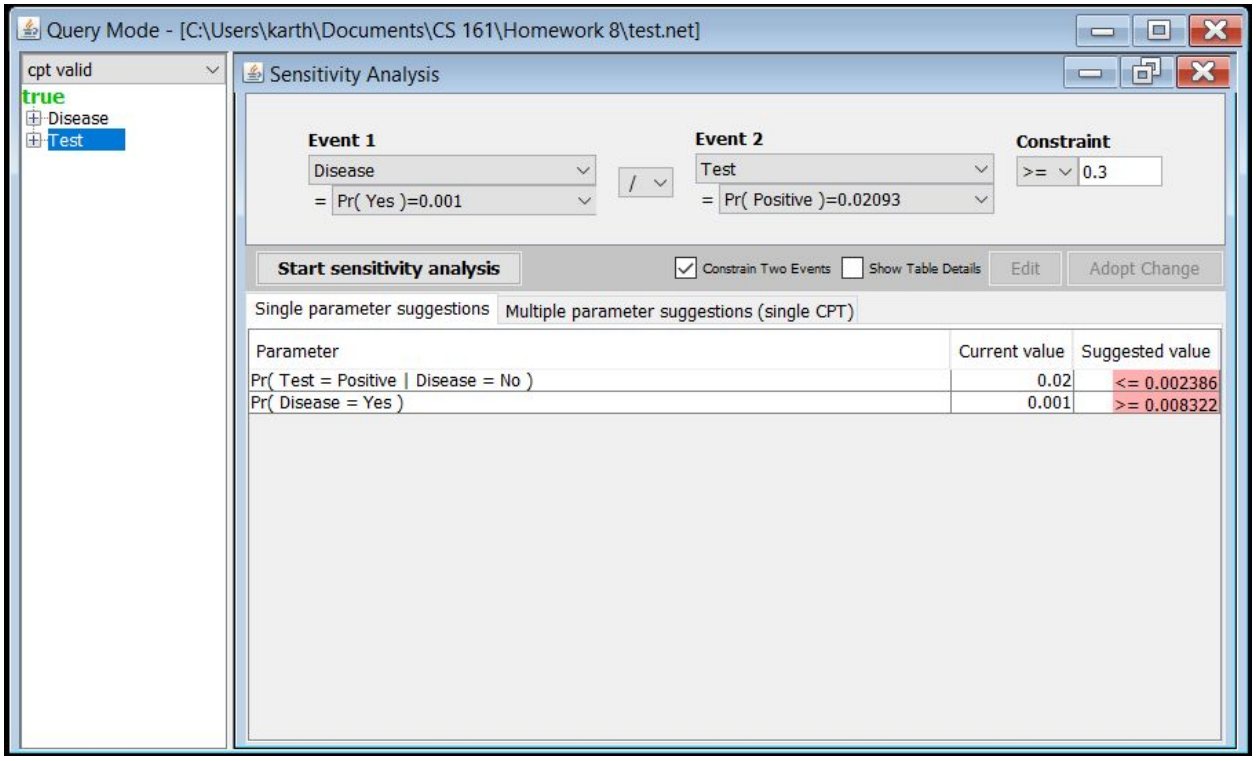
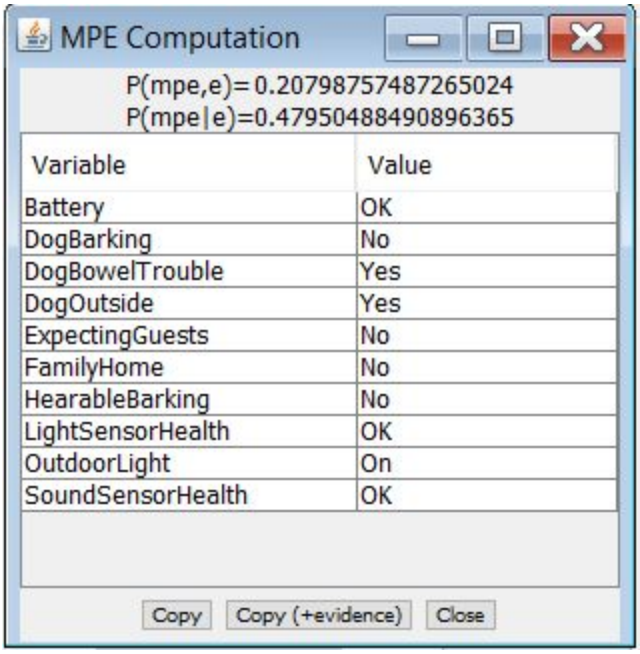
1.



The sensitivity analysis does not show anything for a false negative (Pr(Test = Negative | Disease = Yes)). This is because changing the false negative probability alone would not be able to satisfy the given constraint.

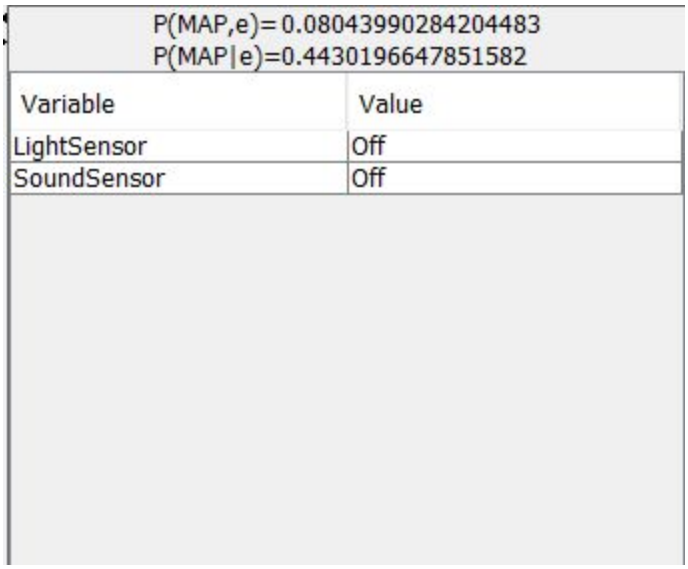
2. a.

The most likely instantiation given that Sambot has sensed the lights to be on and sensed no bark -



Using the variable selection tool, I selected LightSensor to be On and SoundSensor to be Off. I then ran the MPE computation tool to obtain the above table.

b. The most likely instantiation of the sensors given that the family is home and no guests are expected -



Using the variable selection tool, I set FamilyHome to Yes and ExpectingGuests to No. I then ran the MAP tool on the LightSensor and SoundSensor variables, giving the above result.

c. One possible smallest set for Z could be {Battery, FamilyHome}. Battery is a divergent valve and blocks one path between LightSensor and SoundSensor if known, and FamilyHome is a sequential/divergent valve that blocks the other path if it is known. This therefore blocks all paths, leaving LightSensor and SoundSensor d-separated, thus independent given Z.

d. It is a multiply connected network since there is more than one path between some nodes in the network.