1.

(1). See the net file attached

(2).

To satisfy the constraints, the probabilities constraints are

P(D) >= 0.008942

False positive: P(Test = positive | Disease = false) <= 0.002219

2.

(1).

Given that LightSensor = On, SoundSensor = Off, we can get the following by entering the query mode and set LighrSensor and SoundSensor initialized:

Battery: OK

DogBarking:No

DogBowelTrouble: Yes

DogOutside: Yes

ExpectingGuests: No

HearableBarking: No

FamilyHome: No

OutdoorLight: On

LightSensorHealth: OK

SoundSensorHealth: OK

(2). Given FamilyHome = Yes, ExpectingGuests = No, we can get the sensor situation by entering the query mode and set FamilyHome and ExpectingGuests initialized.

LightSensor: Off

SoundSensor: Off

Battery: OK

LightSensorHealth: OK

SoundSensorHealth: OK

(3). Z = {Battery, HearableBarking}.

The path LightSensor->Battery->SoundSensor is blocked by Battery.

The path LightSensor->OutdoorLight->FamilyHome->DogOutside->HearableBarking->SoundSensor is blocked by HearableBarking.

(4). It’s a multiply-connected network.