Wiskow, Volz, Uhlig

9.2.2

For the first task see the python code attached...

9.2 Describe properties of the resulting sequences: what are the similarities and differences to "real" texts?

Normal sentences are constructed around the frame of grammar and generally speaking have a purpose. Humans for example can read sentences without vocals or with certain words missing if only the grammatical structure is correct. These sentences instead are incoherent, singular and senseless, missing any fundamental grammatical Structure.

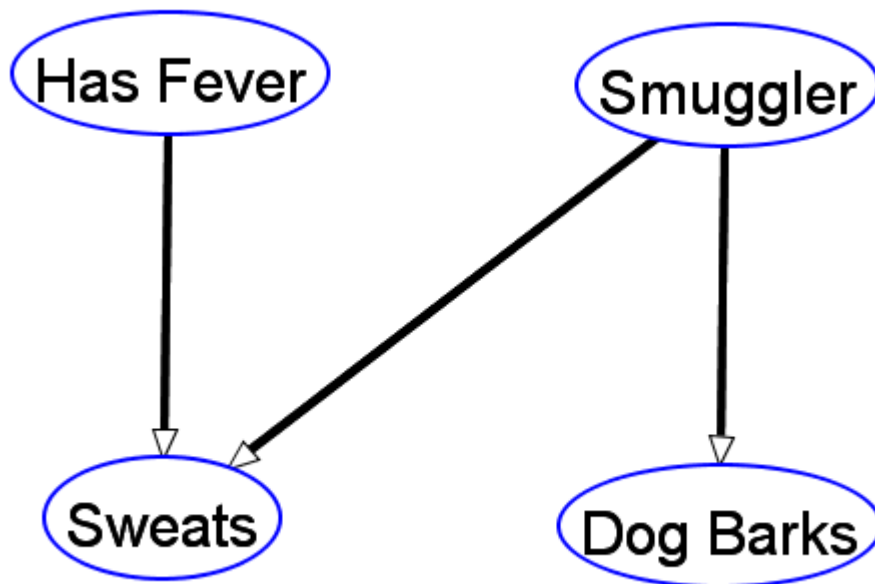## 9.3

Battery = 0.9

Starter = 0.729

Engine = 0.43047

Engine after Pump = 0.729

9.4.

P(Smuggler) = 0.01 ; !P(Smuggler) = 0.99

P(Dog Barks | Smuggler) = 0.8 ; !P(Dog Barks | Smuggler) = 0.2

P(Dog Bark | -Smuggler) = 0.05 ; !P(Dog Barks | -Smuggler) = 0.95

P(Sweats | -Smuggler, - Fever) = 0 ; !P(Sweats | -Smuggler, - Fever) = 1

P(Sweats | Smuggler, - Fever) = 0.4 ; !P(Sweats | Smuggler, - Fever) = 0.6

P(Sweats | Smuggler, Fever) = 0.8 ; !P(Sweats | Smuggler, Fever) = 0.2

P(Sweats | -Smuggler, Fever) = 0.6 ; !P(Sweats | -Smuggler, Fever) = 0.4

P(Fever) = 0.013 ; !P(Fever) = 0.987

Explaining away: In the given network, we can see that 'Sweats' is dependent on 'Has Fever' and 'Smuggler'. If somebody is Sweating and we observe that he has a Fever, 'Has Fever' can explain away 'Smuggler'. Intuitively, this means that if we know somebody that is sweating has a fever, it's less likely that they're sweating because they are a smuggler.

The probability that a person is a smuggler given the observation that the drug dog is barking: 0.13913

The probability that a suspect is sweating (without any prior observation): 0.01177

Wiskow, Volz, Uhlig

The probability that a person is a smuggler given both the observations that that person is sweating and that the drug dog barked at him or her: 0.89357