1. A crime is committed by one of two suspects, A and B. Initially, there is equal evidence against both of them. In further investigation at the crime scene, it is found that the guilty party had a blood type found in 10% of the population. Suspect A does match this blood type, whereas the blood type of Suspect B is unknown. (a) Given this new information, what is the probability that A is the guilty party? (b) Given this new information, what is the probability that B's blood type matches that found at the crime scene?

ANS:

Define events

A: {A is guilty}

B: {B is Guilty}

MA = {A's Blood matches the guilty party}

MB = {B's Blood matches the guilty party}

(a) we want to calculate P(A/MA) .Use Byes rule to Calculate

P(A/MA) = P(MA|A)P(A)/P(MA|A)P(A)+P(MA|B)P(B)

(1.1/2)/(1.1/2)+(1/10* 1/2) = 10/11

(b) we want to calculate P(MB/MA). Use Lots to obtain

P(MB|MA) = P(MB|MA.A)P(A|MA)+P(MB/MB.A)P(B|MA)

= 1/10*10/11 + 1.1/11 = 2/11