ASSIGNMENT NO 8

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:

Let the blood type found at crime seen be X.
Probability that A is guilty **prior** to the new evidence $P(A)=1-P(B)=0.5$
Probability that blood type of X is found **given** A is guilty =Probability that A has the blood type $P(X|A)=1$
Probability that blood type of X is found **given** B is guilty = Probability that B has the blood type $P(X|B)=0.1$
Now it is known that blood type is X, and given exactly one of A or B is guilty,

$$P(A|X)=P(X|A)P(A)/P(X)$$
$$=[P(X|A)P(A)]/[P(X|A)P(A)+P(X|B)P(B)]$$
$$=10/11$$