FA5

2024-03-07

6.

Percentage of messages per server and errors:

```
server1_m <- 0.40
server2_m <- 0.25
server3_m <- 0.35

server1_e <- 0.01
server2_e <- 0.02
server3_e <- 0.015
```

(A). Probability of receiving an email containing an error:

```
errors_p <- (server1_m*server1_e)+(server2_m*server2_e)+(server3_m*server3_e)
errors_p
```

```
## [1] 0.01425
```

(B). Probability of receiving an email without an error:

```
no_error <- 1-errors_p
no_error
```

```
## [1] 0.98575
```

(C). If a message arrives with an error, what is the probability that it was sent through server1? Use the Baye's Theorem

```
bayestheorem <- function(pA,pB,pBA){
    pAB <- (pA*pBA)/pB
  return(pAB)

}

bayestheorem(server1_m,no_error,server1_e)
```

```
## [1] 0.004057824
```

....

9. Variables:

```
no_buy <- 0.20
will_buy <- 0.70
undecided <- 0.10

no_buy_hardaware <- 0.10
will_buy_hardaware <- 0.40
undecided_hardaware <- 0.20
```

(A). calculating P(Gbar)

```
p_upgrade <- (no_buy*no_buy_hardaware)+(will_buy*will_buy_hardaware)+(undecided*undecided_hardaware)
no_upgrade <- 1-p_upgrade
no_upgrade
```

```
## [1] 0.68
```

(B). Posterior probability P(B|G) means, determining the probability of a manager having the intention of buying a new package given that they also intend to upgrade their hardware. This can be calculated using the Baye's theorem which has already been defined in the previous problems.

```
bayestheorem(will_buy,p_upgrade,will_buy_hardaware*will_buy)
```

```
## [1] 0.6125
```

(C). Tree diagram:
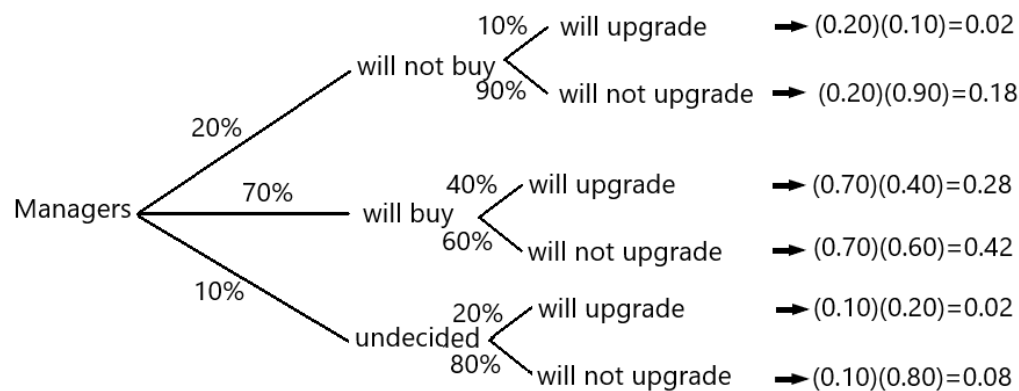
13.

(A). Probability that the spyware infects the system:

```
net <- .70
mail <- .30

net_detect <- .60
mail_detect <- .80

net_infect <- 1-(net*net_detect)
net_infect
```

```
## [1] 0.58
```

```
mail_infect <- 1-(mail*mail_detect)
mail_infect
```

```
## [1] 0.76
```

```
infected <- (net*net_infect)+(mail*mail_infect)
infected
```

```
## [1] 0.634
```

Probability that the spyware infects t he system is 63.4%

(B). Probability that spyware came from the internet if it is detected:

```
from_net <- (net*net_detect)
from_net
```

```
## [1] 0.42
```