

Answer on Question #39871 – Math – Statistics and Probability

A chartered accountant applies for a job in two firms X and Y. He estimates that the probability of his being selected in firm X is 0.7 and being rejected in Y is 0.5 and the probability that at least one of his applications rejected is 0.6. What is the probability that he will be selected in one of the firms?

| | Rejected | Accepted |
|--------|-------------|-------------|
| Firm X | $1-0.7=0.3$ | 0.7 |
| Firm Y | 0.5 | $1-0.5=0.5$ |
| | 0.6 | 0.4 |

A=" selected in firm X ", B="selected in firm Y", C="selected at least in one of the firms",

$D = (\bar{A} \cap B) \cup (A \cap \bar{B}) \cup (\bar{A} \cap \bar{B})$ = "at least one of his applications is rejected".

By assignment statement, $Pr(D) = 0.6$. Then

$$Pr(A \cap B) = 1 - Pr(D) = 1 - 0.6 = 0.4$$

Probability that at least one of applications will be selected:

$$Pr(C) = Pr(A \cup B) = Pr(A) + Pr(B) - Pr(A \cap B) = 0.7 + 0.5 - 0.4 = 0.8$$

Probability that exactly one of application will be selected

$$Pr(E) = Pr((A \cap \bar{B}) \cup (\bar{A} \cap B)) = Pr(A \cap \bar{B}) + Pr(\bar{A} \cap B) = Pr(A/\bar{B})Pr(\bar{B}) + Pr(\bar{A}/B)Pr(B)$$

We cannot calculate this probability without additional assumptions. If we assume that events A and B are independent, then $Pr(A/\bar{B}) = Pr(A)$, $Pr(\bar{A}/B) = Pr(\bar{A})$.

Finally, with additional assumption we have that probability that exactly one of application will be selected

$$Pr(E) = Pr(A/\bar{B})Pr(\bar{B}) + Pr(\bar{A}/B)Pr(B) = Pr(A) \cdot Pr(\bar{B}) + Pr(\bar{A}) \cdot Pr(B) = 0.7 \cdot 0.5 + 0.3 \cdot 0.5 = 0.5$$