Solution of Assignment # 04

A new computer virus can enter the system through e-mail or through the internet. There is a 30% chance of receiving this virus through e-mail. There is a 40% chance of receiving it through the internet. Also, the virus enters the system simultaneously through e-mail and the internet with probability 0.15. What is the probability that the virus does not enter the system at all?

Let I is the event that the virus enters through the internet and E is the event that the virus enters through email. Now IUE is the event that the virus enters through internet or email and $(IUE)^c$ is the event that the virus does not enter the system and we need $P((IUE)^c)$.

It's given that : $P(E) = \frac{30}{100}$, $P(I) = \frac{40}{100}$, $P(I \cap E) = 0.15$

So $P((I \cup E)^c) = 1 - P(I \cup E)$ $\quad [\because P(A^c) = 1 - P(A)]$

$= 1 - [P(I) + P(E) - P(I \cap E)]$

$= 1 - \left[\frac{40}{100} + \frac{30}{100} - 0.15\right]$

$= 1 - 0.55$

$\Rightarrow \boxed{P((I \cup E)^c) = 0.45}$ Ans

Note: $(I \cup E)^c = I^c \cap E^c$ (By DeMorgan's law)