

$$\begin{aligned}Pr(X) &= Pr(S_1 \cup S_2) \\&= Pr(S_1) + Pr(S_2) - Pr(S_1 \cap S_2) \\&= Pr(A) + Pr(B \cap C) - Pr(A \cap B \cap C) \\&= Pr(A) + Pr(B)Pr(C) - Pr(A)Pr(B)Pr(C)\end{aligned}$$