Probability (2)

- Multiplication rule:
  Let events $A, B$. The probability of $A$ and $B$ (i.e. the probability of the intersection $A, B$) can be computed as follows:
  \[ P(A \cap B) = P(A/B)P(B) = P(B/A)P(A). \]

- Independent events:
  The events $A, B$ are independent if the occurrence of one of them does not affect the occurrence of the other event. If $A, B$ are independent then, $P(A/B) = P(A)$, and the multiplication rule is: $P(A \cap B) = P(A)P(B)$.
• Addition rule:
  Let events $A, B$. The probability of $A$ or $B$ or BOTH (i.e. the probability of the union $A, B$) can be computed as follows:
  \[ P(A \cup B) = P(A) + P(B) - P(A \cap B). \]

• If $A, B$ are mutually exclusive events then $P(A \cap B) = 0$, and the addition rule is:
  \[ P(A \cup B) = P(A) + P(B). \]

• If $A, B$ are independent, can they be mutually exclusive?