Logic

Good argument: true premise, premise supports conclusion

Good deductive: it is certain that True premise → True conclusion Validity

Good inductive: it is probable that True premise → True conclusion Strength

Soundness Valid and and true premise

Validity it is impossible that the premises are true and the conclusion is false

↑

Truth table False → False True → True

Concepts of Probability

Gambler's Fallacy knowing that a chance setup is fair, but behaving as if it is unfair

$P(P \wedge Q) = P(P) \times P(Q)$ when independant

Single event (permutation) is an event that occurs if a single specific outcome occurs

Complex event (combination) is an event that occurs if any of a set of mutually exclusive events occurs

$P(A \mid B) = \dfrac{P(A \wedge B)}{P(B)}$ or $= P(A)$ when independant

If A deductively implies B, $P(A) \leq P(B)$

Baye's Theorem

$$P(A \mid B) = \frac{P(A)P(B \mid A)}{P(B)}$$

$$P(B) = P(B \mid A)P(A) + P(B \mid \neg A)P(\neg A)$$

$$\left.\begin{aligned} P(A \cap B) &= 0 \\ P(A \cup B) &= P(A) + P(B) \\ P(A \mid B) &= 0 \\ P(A \mid \neg B) &= \frac{P(A)}{1 - P(B)} \end{aligned}\right\} \text{mutually exclusive } A, B$$

$$\left.\begin{aligned} P(A \cap B) &= P(A)P(B) \\ P(A \cup B) &= P(A) + P(B) - P(A)P(B) \\ P(A \mid B) &= P(A) \\ P(A \mid \neg B) &= P(A) \end{aligned}\right\} \text{independent } A, B$$