Set theoretic terminology, and its interpretation in event/outcome language

Notation	set-theoretic terminology	interpretation(s)
S	universal set	outcome space
$a \in S$	element of S	individual outcome
$A \subset S$	subset of S	event (collection of outcomes)
A^c (or $\overline{A}$)	complement of A	A does **not** occur the **opposite** of A occurs
$A \cup B$	union of A and B	A **or** B occurs (non-exclusive "or") **at least one of** A and B occurs
$A \cap B$ (or AB)	intersection of A and B	**both** A **and** B occur
$A \cap B = \emptyset$	A and B are disjoint sets	A and B are **mutually exclusive** A and B cannot both occur
$A \subset B$	A is a subset of B	if A occurs then B occurs A implies B
$A \setminus B$	set-theoretic difference	A occurs, but B does not occur

Some set-theoretic properties and rules

- $(A \cup B)^c = A^c \cap B^c$ (De Morgan's Law, I)
- $(A \cap B)^c = A^c \cup B^c$ (De Morgan's Law, II)
- $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$ (Distributive Law, I)
- $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$ (Distributive Law, II)

Notes and hints

- **Draw Venn diagrams:** Perhaps the most useful piece of advice when working with sets is to draw Venn diagrams, especially in more complicated situations. Most set-theoretic rules become obvious with a Venn diagram. Instead of memorizing long lists of rules, derive these as needed through a Venn diagram. The only exceptions are the distributive laws and De Morgan's laws stated above, which occur frequently enough to be worth memorizing. (For practice, try to derive those rules via Venn diagrams.)
- **Use proper set-theoretic notation:** Arithmetic operations like addition, subtraction, multiplication don't make sense in the context of sets, and you shouldn't use arithmetic notations like $+$, $-$, $\cdot$, with sets. Thus, write $A \cup B$, not $A + B$, $A \setminus B$, not $A - B$, etc.