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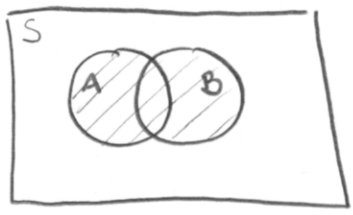
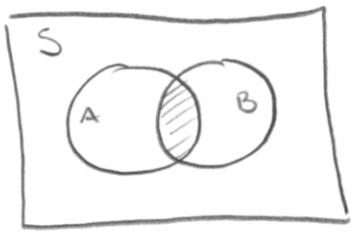
§ 4.5 EVENT RELATIONS & PROBABILITY RULES

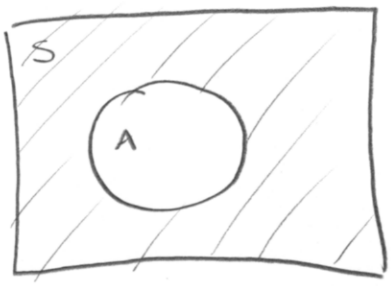
DEF: THE UNION OF A & B,
$A \cup B$ = THE EVENT THAT EITHER A OR B OR BOTH OCCUR



DEF: THE INTERSECTIONS OF A & B,
$A \cap B$ IS THE EVENT THAT BOTH A & B OCCUR

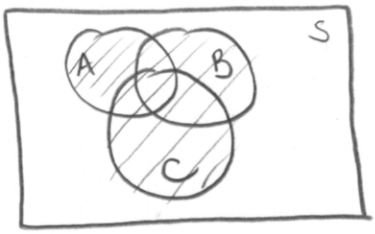


DEF THE COMPLIMENT OF AN EVENT A, A^c, IS THE EVENT THAT A DOES NOT OCCUR

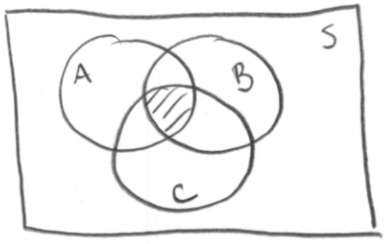


ex 1 TWO FAIR COINS TOSSED.
A: AT LEAST ONE HEAD.
B: AT LEAST ONE TAIL.
DEFINE A, B, $A \cup B$, $A \cap B$, A^c, B^c AS COLLECTIONS OF SIMPLE EVENTS & FIND THEIR PROBABILITIES.

EXTENSIONS TO 3 OR MORE EVENTS



$A \cup B \cup C$



$A \cap B \cap C$

ADDITION RULE Given 2 events A, B.

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$

↑ otherwise counted twice.

A & B

Note: **mutually exclusive** $\Rightarrow P(A \cap B) = 0$

↓

In particular, A & A^c are mutually exclusive,

and $A \cup A^c = S$

COMPLIMENTS RULE $P(A) + P(A^c) = 1$, i.e.

$$P(A^c) = 1 - P(A)$$

ex. Prob. table p. 143