

L23 - Properties of Probability

Sample Space - Everything possible (S)

Event - What we want to assess

Probability - $\frac{\text{Count (event)}}{\text{Count } (S)}$

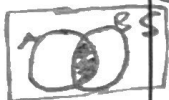
"The probability of an event is the long run proportion of times the event would occur if the random process were repeated indefinitely"

Intersection - \cap "And"

Union - \cup "Or"

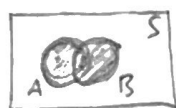
Complement - A^c "not A"

disjoint - mutually exclusive $P(A \cap B) = 0$



$P(A \cap B)$ - Probability both A and B happened.

$P(A \cup B)$ - Probability that either A or B happened



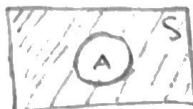
$$= P(A) + P(B) - P(A \cap B)$$

$P(A)$



← The number of outcomes in A divided by the number of events in S.. assuming each outcome in S is equally likely to occur

$$P(A') = 1 - P(A)$$



Disjoint (aka mutually exclusive)



$$P(A \cap B) = 0$$

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

ex. S = outcomes of rolling a dice

→ random process

$$S = \{1, 2, 3, 4, 5, 6\}$$

A = rolling odd

$$A = \{1, 3, 5\}$$

$$P(A) = 3/6$$

Allan and Beth

Random Process: randomly choosing a movie from top 100

A: event that allen has seen the movie

B: event that Beth has seen the movie

	B	B'	Total
A	42	6	48
A'	17	35	52
Total	59	41	100

	B	B'	Total
A	$P(A \cap B)$.42	$P(A \cap B')$.06	$P(A)$.48
A'	$P(A' \cap B)$.17	$P(A' \cap B')$.35	$P(A')$.52
Total	$P(B)$.59	$P(B')$.41	$P(S)$ 1

