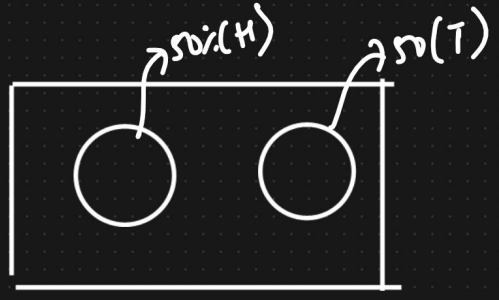
Probability → Addition Rule (or)

Mutual Exclusive Events

Two events are Mutual Exclusive Events if they cannot occur at the same time.

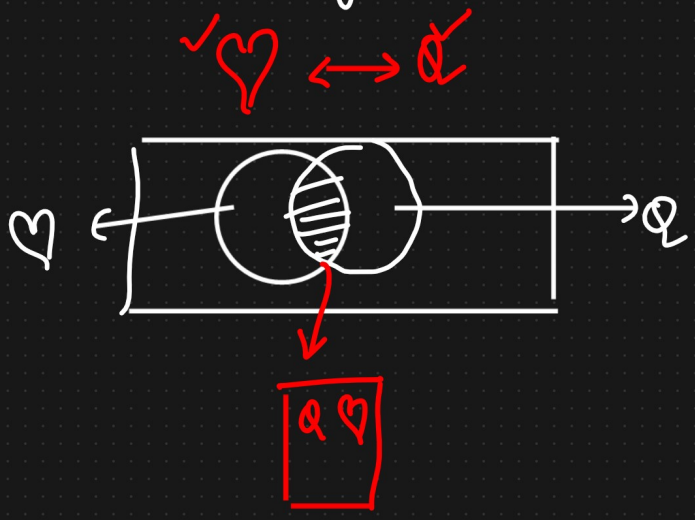
Eg: Flipping a coin {H & T}



Non Mutual Exclusive

They can occur

Eg: Pick a card randomly from a deck of cards



Mutual Exclusive Event

Eg 1 If I flip a coin, what is the probability of getting heads or tails?

$$Pr(H) = \frac{1}{2} = 0.5 \qquad Pr(T) = \frac{1}{2} = 0.5$$

Addition Rule for mutual exclusive Events

$$P(A \text{ or } B) = P(A) + P(B)$$

$$P(H \text{ or } T) = P(H) + P(T)$$

$$= 0.5 + 0.5$$

$$= 1$$

Eg: Rolling a dice. Probability of getting 2 or 3 or 6

Non Mutual Exclusive Event

Q) When picking randomly from a deck of cards, what is the probability of choosing a card that is heart or a Queen?

Ans) $P(\text{Heart}) = \frac{13}{52}$ $P(\text{Queen}) = \frac{4}{52}$ $P(\text{Q \& Heart}) = \frac{1}{52}$

Addition Rule for non mutual exclusive events

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(\heartsuit \text{ or } Q) = P(\heartsuit) + P(Q) - P(Q \& H)$$

$$= \frac{13}{52} + \frac{4}{52} - \frac{1}{52}$$

$$= \frac{16}{52} = 0.307 = 30.7\%$$