# Probability Addition Rule

## Definition

The Addition Rule in probability calculates the chance that at least one of multiple events occurs.

If events A and B are mutually exclusive: P(A ∪ B) = P(A) + P(B)  
If not mutually exclusive: P(A ∪ B) = P(A) + P(B) - P(A ∩ B)

## Example

Suppose the probability of drawing a King from a deck is 4/52 and the probability of drawing a Queen is 4/52.  
Since these are mutually exclusive events:  
  
P(K ∪ Q) = P(K) + P(Q) = 4/52 + 4/52 = 8/52 = 2/13  
  
If not mutually exclusive, we subtract the intersection: P(A ∪ B) = P(A) + P(B) - P(A ∩ B)

## Python Code

P\_A = float(input("Enter probability of event A: "))  
P\_B = float(input("Enter probability of event B: "))  
overlap = input("Are the events overlapping? (yes/no): ").strip().lower()  
  
if overlap == "yes":  
 P\_A\_and\_B = float(input("Enter probability of both A and B: "))  
 result = P\_A + P\_B - P\_A\_and\_B  
else:  
 result = P\_A + P\_B  
  
print(f"Probability of A or B: {result:.4f}")