# Probability Multiplication Rule

## Definition

The Multiplication Rule helps calculate the probability of two events happening together.  
If events A and B are independent: P(A ∩ B) = P(A) \* P(B)  
If dependent: P(A ∩ B) = P(A) \* P(B|A)

## Example

Example 1 (Independent): Tossing a coin and rolling a die:  
P(H ∩ 4) = P(H) \* P(4) = 1/2 \* 1/6 = 1/12  
  
Example 2 (Dependent): Drawing 2 cards without replacement:  
P(Ace1 ∩ Ace2) = (4/52) \* (3/51) = 1/221

## Python Code

P\_A = float(input("Enter probability of event A: "))  
dependent = input("Is event B dependent on A? (yes/no): ").strip().lower()  
  
if dependent == "yes":  
 P\_B\_given\_A = float(input("Enter probability of B given A: "))  
 result = P\_A \* P\_B\_given\_A  
else:  
 P\_B = float(input("Enter probability of event B: "))  
 result = P\_A \* P\_B  
  
print(f"Probability of both A and B: {result:.4f}")