The Fundamental Counting Principle

If one operation can be performed in m ways
and a second operation can be performed in n ways,
then the number of ways to perform the sequence of two operations is $m \cdot n$.

This rule can be extended to any number of operations performed in sequence.

Example 1. A section of an exam contains four true–false questions.
A completed exam paper is selected at random, and the four answers are recorded.
How many answers are possible? (That is, find the number of all possible outcomes.)

Questions :	Q1		Q2		Q3		Q4
Possible answers:	T or F		T or F		T or F		T or F
Number of outcomes:	2	×	2	×	2	×	2 = 16

Example 2. Three fair coins are tossed. What is the number of all possible outcomes?

Coins:	Coin 1		Coin 2		Coin 3
Possible outcomes:	H or T		H or T		H or T
Number of outcomes:	2	×	2	×	2 = 8