You can see that showing all possible outcomes for a task involving several decisions with a several choices for each decision can become unmanageable. In many situations, we are not interested in listing the actual specific outcomes but we are just interested in *how many* different outcomes are possible.

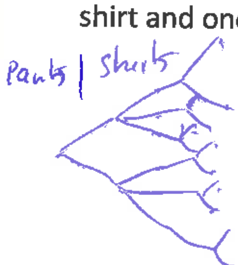
Fortunately, there is a more efficient way to determine the *number* of different arrangements of a certain number of objects rather than individually listing and then counting them. This more efficient way is called the Fundamental Counting Principle.

The **Fundamental Counting Principle** states that:

If one task can be performed in "m" ways and another task can be performed in "n" ways, then the two tasks together can be performed in $m \times n$ ways.

Example 4

You are packing a wardrobe for an upcoming weekend trip. You pack two different colours of pants (black and blue), three different shirts (red, white, and grey) and two different jackets (green and white). Determine the number of different wardrobe combinations possible by wearing one pair of pants, one shirt and one jacket.



2 × 3 × 2 = 12 outcomes

pants (2 colours) × shirts (3 colors) × Jackets (2 colors) = 12 possible combinations of pants/shirts/Jacket

Example 5

You are driving from your small town to the Big City and then you will continue on to visit your grandparents' village. There are two roads to choose from between your town and the Big City and five roads to choose from between the Big City and your grandparents' village. How many different ways are there to complete your journey?

2 roads

SmallTown = B ≡ Village

5 roads

2 ways × 5 way = 10 way