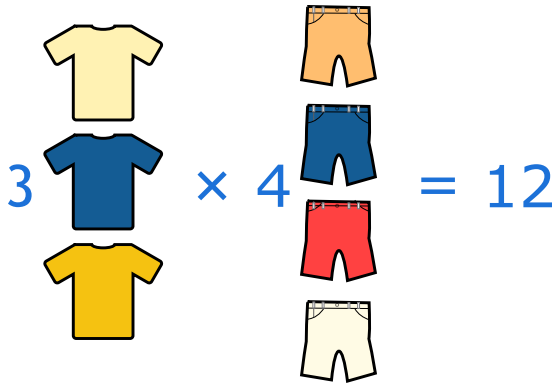
The Fundamental Counting Principle

When there are **m** ways to do one thing,
and **n** ways to do another,
then there are **m×n** ways of doing **both**.



Example: you have 3 shirts and 4 pants.

That means **3 × 4 = 12** different outfits.

Example: There are 6 flavors of ice-cream, and 3 different cones.

That means **6 × 3 = 18** different single-scoop ice-creams you could order.

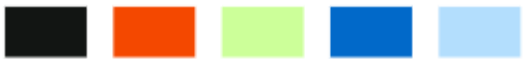
It also works when you have more than 2 choices:

Example: You are buying a new car.

There are **2** body styles:

sedan or hatchback

There are **5** colors available:

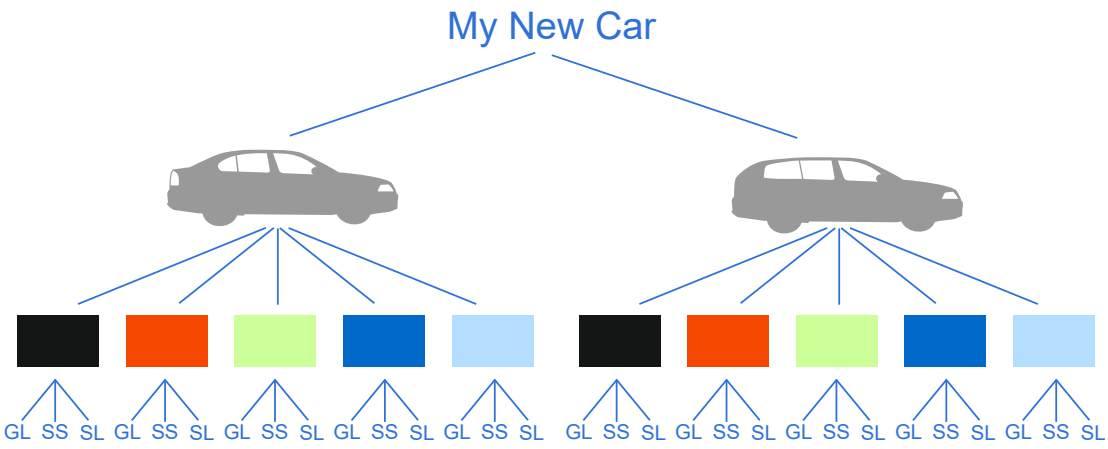


There are **3** models:

- GL (standard model),
- SS (sports model with bigger engine)
- SL (luxury model with leather seats)

How many total choices?

You can see in this "tree" diagram:



You can count the choices, or just do the simple calculation:

Total Choices = 2 × 5 × 3 = 30

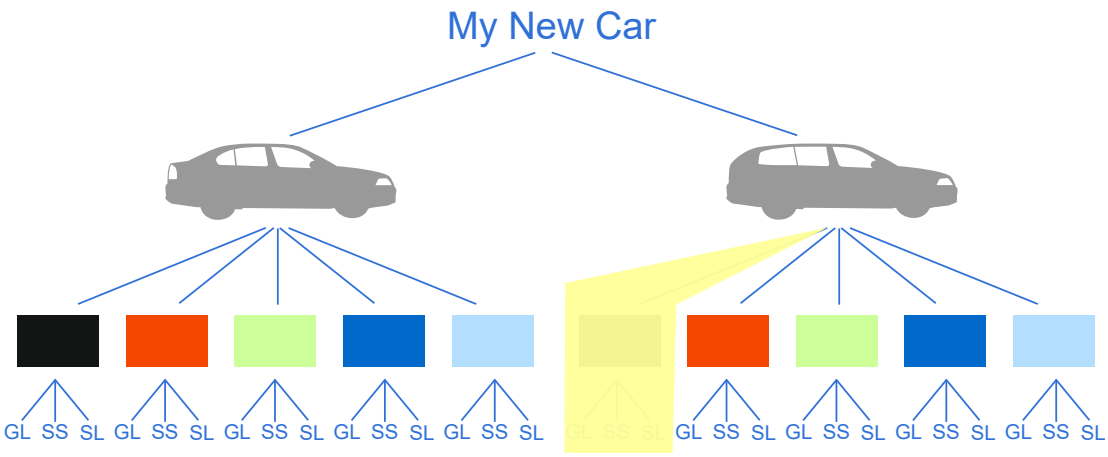
Independent or Dependent?

But it only works when all choices are **independent** of each other.

If one choice affects another choice (i.e. **depends** on another choice), then a simple multiplication is not right.

Example: You are buying a new car ... but ...

the salesman says **"You can't choose black for the hatchback"** ... well then things change!



You now have only 27 choices.

Because your choices are **not independent** of each other.

But you can still make your life easier with this calculation:

Choices = 5×3 + 4×3 = 15 + 12 = 27