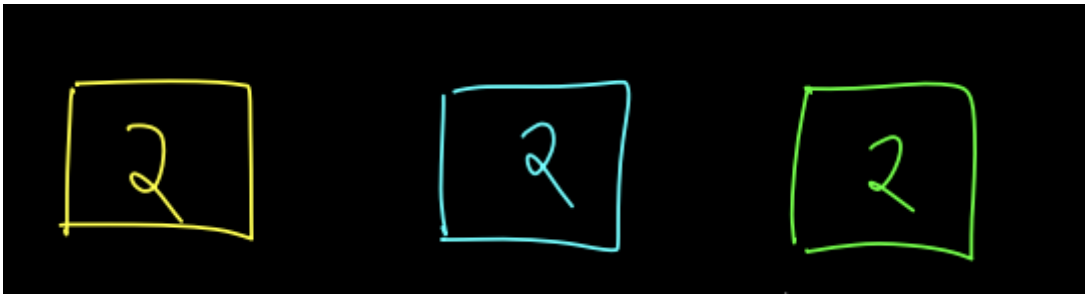
Combinatorics

- Today we will be understanding combinatorics by solving problems.

Problem -1

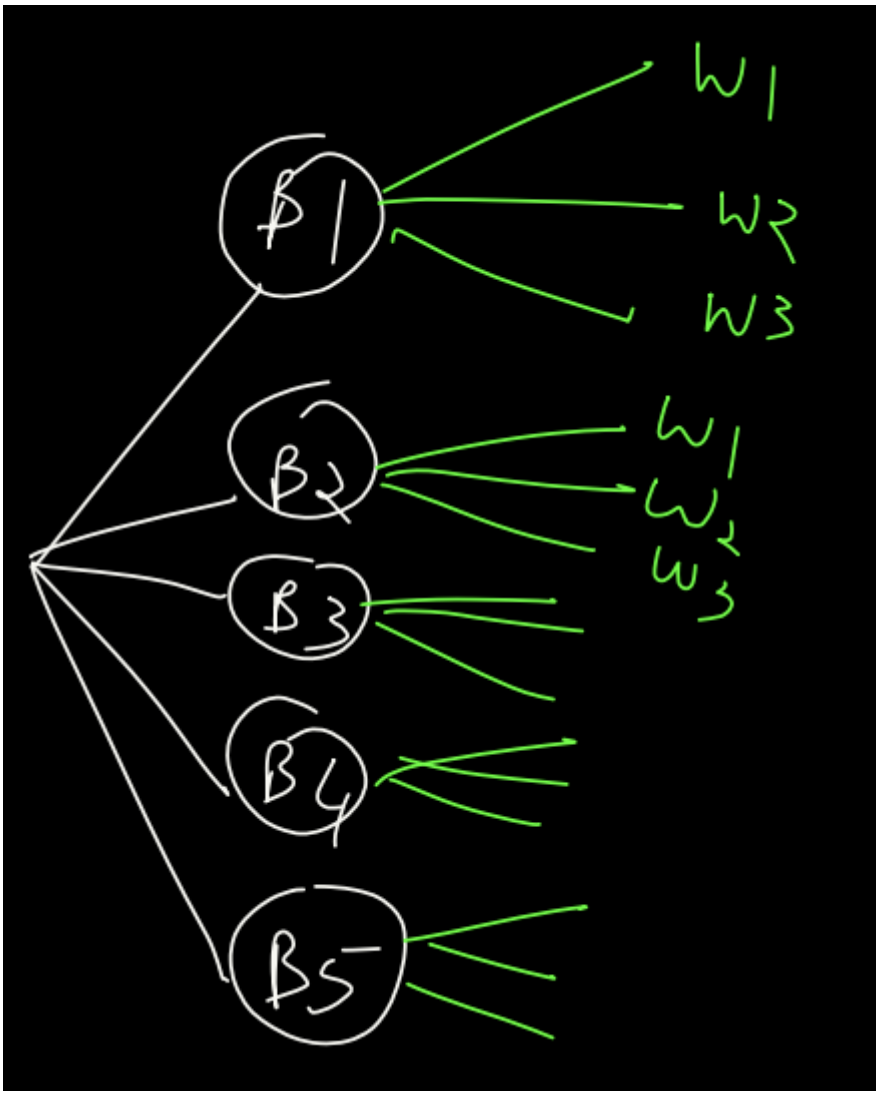
India and Pakistan play a 3-match series. How many results are possible?
Note that we consider (Ind, Ind, Pak) different from (Ind, Pak, Ind) etc.

- For each match played between India and Pak, there are 2 possibilities.
- Now what we do ? Do we add all 2's or multiply them to get the answer ?



Problem - 2

In a bowl-out, for a specific ball you have to choose a bowler and a wicket keeper.
Suppose you have 5 bowlers and 3 wicket keepers. How many ways can you select for a ball?



Problem - 3

There are 3 ways to move from Chennai to Bangalore.
There are 4 ways to move from Bangalore to Delhi.

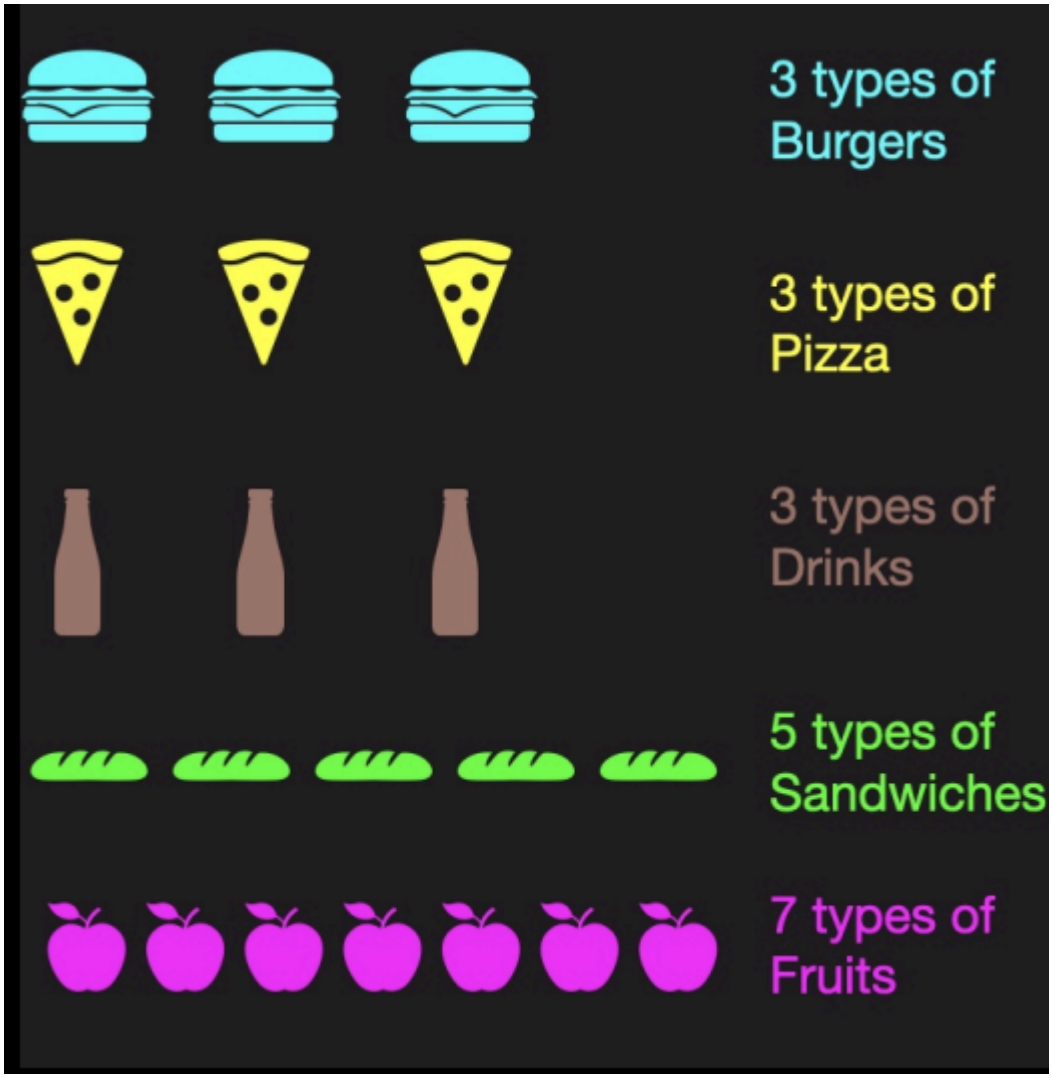
In how many ways can one reach from Chennai to Delhi via BLR?

Problem - 4

There are 3 ways to move from Chennai to Bangalore, and 4 ways to move from Bangalore to D
There are 2 ways to move from Chennai to Hyderabad, and 3 ways to move from Hyderabad to Delhi. In how many ways can we move from Chennai to Delhi?

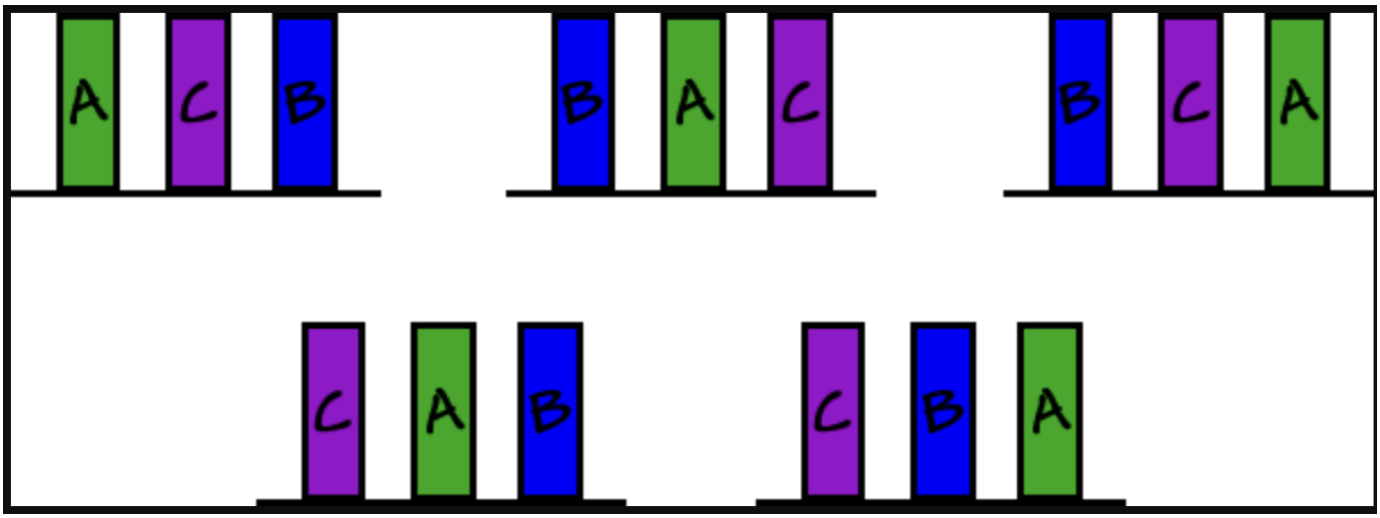
Problem - 5

A fast food outlet has the following types of items in their menu.
You can choose one of the following combos:
1 Buger and 1 Sandwhich
1 Fruit and 1 Drink
1 Pizza
How many such combos can you make ?



Permutations

- A permutation is an arrangement of items or elements in a specific order, where the order of the arrangement matters. In other words, it's a way of rearranging things, such as numbers, letters, or objects, into different sequences.



Problem- 1

What is the number of ways of ARRANGING three characters A, B, C?

Problem- 2

What is the number of ways of ARRANGING four characters A, B, C, D

Problem - 3

Given 5 different characters, in how many ways can we arrange them in 2 places?

Combinations

- A combination is a selection of items or elements from a group, where the order of the selection does not matter. In other words, it's a way of choosing a subset of things without considering the arrangement or sequence in which they are chosen.

Problem -1

There 4 players who are good in top order batting.Top order positions are No1, No2 and No3
The names of 4 players are Sachin, Sehwag, Rohit and Kohli.

So how many top order line-ups you can make with these batsman.

Keep in mind here order do not matter.

Problem - 2

A Maruti Showroom has 3 colours in their “Baleno” model and 3 colours in the “Swift” model
In how many ways can they place it such that Baleno and Swift are kept in alternate slots?

```
import numpy as np

np.math.factorial(4)
```

```
24
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