

Toss a coin

While tossing a fair coin, the Sample Space would be H-Heads and T-Tails.

$S = H, T$



Similarly , in tossing two identical coins or a coin twice , the Sample Space would be just the cross product of single coin toss



i.e. $S = HH, HT, TH, TT$



Extending it furthur, In tossing 3 identical coins or a coin thrice

$S = HHH, HHT, HTH, THH, HTT, THT, TTH, TTT$



Q: However , If we have all different coins, the case would be much more surprising



In this case, we see that the first leftmost element can be filled in 6 ways. Now in each case we have only two coins with 2 sides are available for the rest of 2 positions which can be filled in $2 \times 2 \times 2$ ways. $S = H_1H_2H_3, H_2T_3, T_3H_2, T_2T_3$ and swapped

So, 48 total ways.

We see that first place can be filled in 6 ways, second place in 4 ways and third place in 2 ways.