We know there are $a!$ permutations of a elements, we may rethink it in another way. We think $a!$ is the possibilities of the way that you pick a elements from a elements. Now, we can generailize the first a, that is, pick k elements from n elements. It's easy to see that it is exactly $n!$ but only first k terms, that is, $\frac{n!}{(n-k)!}$.

If we don't care about the order, we may divide $\frac{n!}{(n-k)!}$ by the amount of the permutations of k elements, that is $k!$.

We may denote pick k elements in n elements (without order) by C_k^n, which is exactly $\frac{n!}{(n-k)!k!}$.