## Counting

Permute $=n P r=n!/(n-r)$ !
Combinations $=\mathrm{nCr}=\mathrm{n}!/ \mathrm{r}!(\mathrm{n}-\mathrm{r})$ !
Circular Permutation $=\mathrm{n}!/ \mathrm{n}(\mathrm{eg}, 6 \mathrm{ppl}$ around tables $=5$ !)
Inclusion-Exclusion Principle: if there are cases when both things are done together, we need to subtract the number of ways to do both from the sum.

## Complexity

## Algorithims:

- Precise: they must be written in terms understandable by anyone
- Effective: a step must help the algorithm progress to the final goal
- Practical: a sequence of precise and effective steps may not be useful in practice



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