

Fixing the overcounting

Each set A of k elements is obtained through $k!$ ways of running the algorithm. As an example, we can generate $\{s_1, s_5, s_3\}$ in 6 ways, depending upon the order in which we pick each of the three elements.

So the number of different sets is the number of ways of running the algorithm, divided by $k!$.

The solution is $n!/[k!(n-k)!]$