This generalizes to s steps.

Ex: How many n-bit strings are there? 2^n

$$\underbrace{2 \cdot 2 \cdot 2 \cdots 2}_{n}$$

Ex: How many subsets does an n-element set have? $\{a_1, a_2, \ldots, a_n\}$. 2^n

For each a_i, choose to put it in the subset or leave it out.

Ex: How many 4-character passwords, where each is either a lower-case letter or a digit, and the first has to be a letter? $26 \cdot 36^3$

Ex: Same, but no restriction on first character, and no character can be repeated? $36 \cdot 35 \cdot 34 \cdot 33$

Permutations:

How many ~~sequenes~~ sequences using $\{1,2,3\}$ are there, in which each is used exactly once?

$3 \cdot 2 \cdot 1 = 6$

How many using $\{1, 2, \ldots, n\}$?

$n(n-1)(n-2)\cdots 3 \cdot 2 \cdot 1 = n!$ $\quad 0! = 1$.

k-permutations: How many sequences of length k use the characters $\{1, 2, \ldots, n\}$ each either 0 or 1 time?

$$P(n,k) = n(n-1)(n-2)\cdots(n-k+1) = \frac{n!}{(n-k)!}$$

Back to the password example:

$$P(36,4) = \frac{36!}{32!}$$