



Math for the people, by the people.

alphabet

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An *alphabet* Σ is a nonempty finite set such that every string formed by elements of Σ can be decomposed uniquely into elements of Σ .

For example, $\{b, lo, g, bl, og\}$ is not a valid alphabet because the string *blog* can be broken up in two ways: b lo g and bl og. $\{Ca, ña, d, a\}$ is a valid alphabet, because there is only one way to fully break up any given string formed from it.

If Σ is our alphabet and $n \in \mathbb{Z}^+$, we define the following as the *powers of Σ* :

- $\Sigma^0 = \lambda$, where λ stands for the empty string.
- $\Sigma^n = \{xy | x \in \Sigma, y \in \Sigma^{n-1}\}$ (xy is the juxtaposition of x and y)

So, Σ^n is the set of all strings formed from Σ of length n .