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Since for every letter a in the alphabet Σ we can associate the word a itself, we obtain an embedding of the alphabet $\Sigma = \{a_1, \dots, a_n\}$ in Σ^* , obtained by $a_i \mapsto a_1 \dots a_i a_1 \dots a_n$. The free monoid of words Σ^* on the alphabet satisfies the so-called "universal property" which, briefly, can be described as:

Theorem 1. Every function f from the Alphabet Σ to any monoid M can be extended to a morphism of monoids from Σ^* to M .



This property allows us, in order to describe a morphism from Σ^* to another monoid M , to define only a correspondence from Σ (which is finite) to M . The elements of Σ^* are written $w = a_1 a_2 \dots a_n$, where $a_i \in \Sigma$. A language over Σ is, simply, any subset of Σ^* .

- We have to remark that, for a word $w = a_1 a_2 \dots a_n$, the order and the multiplicity of appearance are important.