Alphabet – non-empty set (∑, φ, Γ)

Alphabet consists of Symbols

A sequence of symbols x\_i (i in n) of ∑ called a word of length n over ∑.

Word of length 0 is called an empty word - ε.

{ ε } ≠ ∅

A set of all words over ∑ is called sigma-star - ∑\*. E.g. ∑ = {a} then ∑\*={ ε, a, aa, aaa, …}.

A set of all non-empty words is called Sigma-Plus ∑+=∑\*- { ε }.

A formal language is a subset of ∑\*.

Operations:

1. Concatenation - ● or nothing: w\_1 = ab, w\_2 = bb then w\_1 w\_2 = abbb – word from {a, b}\*
   1. Can also be used on sets - M●N = {u●v |for u in M and v in N}

Grammatics:

Grammatic generate words and build a formal language.  
Generator is a finite set R of Rules which is used together with two Alphabets to generate a countable set of Words.

Grammatic consists of two disjunct Alphabets (Terminal Symbols ∑ and Variables (Non-terminal Symbols φ)), Start symbol S of φ as well as a Rule set R.

G = (φ, ∑, R, S).

A Word is a part of a language generated by Grammatic if it’s derived from the Start Symbol and consists only of terminal symbols.