a grammar (when the context is not given, often called a formal grammar for clarity) describes how to form strings from a language's [alphabet](https://en.wikipedia.org/wiki/Alphabet_%28computer_science%29%22%20%5Co%20%22Alphabet%20%28computer%20science%29) that are valid according to the language's [syntax](https://en.wikipedia.org/wiki/Syntax_%28programming_languages%29%22%20%5Co%20%22Syntax%20%28programming%20languages%29). A grammar does not describe the [meaning of the strings](https://en.wikipedia.org/wiki/Semantics%22%20%5Co%20%22Semantics) or what can be done with them in whatever context—only their form. A formal grammar is defined as a set of [production rules](https://en.wikipedia.org/wiki/Production_%28computer_science%29%22%20%5Co%20%22Production%20%28computer%20science%29) for [strings](https://en.wikipedia.org/wiki/String_%28computer_science%29%22%20%5Co%20%22String%20%28computer%20science%29) in a formal language.

1. **Derivation**, in descriptive [linguistics](https://www.britannica.com/science/linguistics) and traditional [grammar](https://www.britannica.com/topic/grammar), the formation of a word by changing the form of the base or by adding affixes to it (e.g., “hope” to “hopeful”). It is a major source of new words in a [language](https://www.britannica.com/topic/language). Strings may be derived from other strings using the productions in a grammar. If a grammar G has a production α → β, we can say that x α y derives x β y in G. This derivation is written as −

x α y ⇒G x β y

ii. Production: A production or production rule in computer science is a [rewrite rule](https://en.wikipedia.org/wiki/Rewrite_rule%22%20%5Co%20%22Rewrite%20rule) specifying a symbol substitution that can be recursively performed to generate new symbol sequences. A finite set of productions {\displaystyle P} is the main component in the specification of a [formal grammar](https://en.wikipedia.org/wiki/Formal_grammar%22%20%5Co%20%22Formal%20grammar) (specifically a [generative grammar](https://en.wikipedia.org/wiki/Generative_grammar%22%20%5Co%20%22Generative%20grammar)). The other components are a finite set {\displaystyle N} of [nonterminal symbols](https://en.wikipedia.org/wiki/Nonterminal_symbol%22%20%5Co%20%22Nonterminal%20symbol), a finite set (known as an alphabet) {\displaystyle \Sigma } of [terminal symbols](https://en.wikipedia.org/wiki/Terminal_symbol%22%20%5Co%20%22Terminal%20symbol) that is [disjoint](https://en.wikipedia.org/wiki/Disjoint_sets%22%20%5Co%20%22Disjoint%20sets) from {\displaystyle N} and a distinguished symbol {\displaystyle S\in N} that is the start symbol.

iii. Sentence:

iv. Null symbol: it is also known as empty string. Formally, a string is a finite, ordered sequence of [characters](https://en.wikipedia.org/wiki/Character_%28symbol%29%22%20%5Co%20%22Character%20%28symbol%29) such as letters, digits or spaces. The empty string is the special case where the sequence has length zero, so there are no symbols in the string. There is only one empty string, because two strings are only different if they have different lengths or a different sequence of symbols. In formal treatments,[[1]](https://en.wikipedia.org/wiki/Empty_string%22%20%5Cl%20%22cite_note-1) the empty string is denoted with [ε](https://en.wikipedia.org/wiki/%CE%95%22%20%5Co%20%22%CE%95) or sometimes [Λ](https://en.wikipedia.org/wiki/%CE%9B%22%20%5Co%20%22%CE%9B) or [λ](https://en.wikipedia.org/wiki/%CE%9B%22%20%5Co%20%22%CE%9B).