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Assignment:

* A formal grammar is a set of rules for rewriting strings, along with a "start symbol" from which rewriting starts, it describes how to form strings from a language's [alphabet](https://en.wikipedia.org/wiki/Alphabet_%28computer_science%29) that are valid according to the language's [syntax](https://en.wikipedia.org/wiki/Syntax_%28programming_languages%29). A grammar does not describe the [meaning of the strings](https://en.wikipedia.org/wiki/Semantics) 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) for [strings](https://en.wikipedia.org/wiki/String_%28computer_science%29) in a formal language. A grammar in compiler construction usually consists of at least two parts and sometimes three, less often one. I will start with the most common case first. The grammar has two parts, a lexical (lexer) specification, and a syntactic (parser) specification.
* Derivation is used to find whether the string belongs to a given grammar, we have two types; Leftmost and rightmost derivation. Leftmost- In leftmost derivation, at each and every step the leftmost non-terminal is expanded by substituting its corresponding production to derive a string. rightmost- In rightmost derivation, at each and every step the rightmost non-terminal is expanded by substituting its corresponding production to derive a string.
* Production: The productions of a grammar specify the manner in which the terminals and non-terminals can be combined to form strings. Each production consists of a non-terminal called the left side of the production, an arrow, and a sequence of tokens and/or on- terminals, called the right side of the production.
* Sentence: A sentence is a sentential form consisting only of terminals such as a + a \* a
* Null symbol: A null character is a character with all its bits set to zero. Therefore, it has a numeric value of zero and can be used to represent the end of a string of characters, such as a word or phrase. This helps programmers determine the length of [strings](https://techterms.com/definition/string). In practical applications, such as database and spreadsheet programs, null characters are used as fillers for spaces.