

## Context-Free Grammars

A context-free grammar is specified by:

- A finite set of terminal symbols
- A finite set of nonterminal symbols (disjoint from the terminals)
- A finite set of productions of the form

$$\langle A \rangle \rightarrow \alpha$$

where  $\langle A \rangle$  is a nonterminal symbol and  $\alpha$  is a sequence (possibly the null sequence) of terminal and non terminal symbols

- A starting nonterminal symbol

A context-free language is the set of all terminal strings that can be derived from the starting symbol of a context-free grammar.

Corresponding to each string derived from a given context-free grammar, there are one or more associated derivation trees. Corresponding to each derivation tree there are one or more derivations. Corresponding to each derivation tree there is a unique leftmost derivation and a unique rightmost derivation. If each string derived from a given context-free grammar has only one derivation tree, the grammar is said to be unambiguous.

A language may be described by many different context-free grammars.

Note: Ambiguity is a property of a grammar, not a language.