DERIVATIONS

Given a grammar G = (N, T, S, P) and strings $\alpha_1, \alpha_2, \ldots, \alpha_n$ of $(N \cup T)^*$

- $\alpha_1 \Rightarrow \alpha_2$ means that one of the non-terminals of α_1 had been replaced in α_2 by a sequence of terminals and non-terminals in accordance with one of the productions in P
- α_1 **derives** α_n if $\alpha_1 \Rightarrow \alpha_2 \Rightarrow \ldots \Rightarrow \alpha_n$
- $\alpha_1 \Rightarrow \alpha_n$ means that α_1 derives α_n in 0 or more steps
- $\alpha_1 \Rightarrow \alpha_n$ means that α_1 derives α_n in 1 or more steps

Given a derivation $S \Rightarrow \alpha_n$:

- If α_n contains only terminals, then it is called a **sentence** of G
- If α_n contains some non-terminals, then it is called a **sentential form** of G
- The derivation is a **leftmost derivation** if at every step only the leftmost non-terminal was replaced.
- The derivation is a **rightmost derivation** if at every step only the rightmost non-terminal was replaced.

PARSE TREES

- A **parse tree** is a graphical representation of a derivation

AMBIGUITY

- A grammar which produces more than 1 parse tree for one of its sentences is said to be **ambiguous**.