

The two derivations are identical for except for two consecutive steps, during which the same two non-terminals are replaced by the same two strings but in opposite orders in the two derivations.

The **derivation** in which the leftmost of the two nonterminals is replaced first is said to **precede** the other.

Ex:

$$S \rightarrow \epsilon \quad S \rightarrow SS \quad S \rightarrow (S) \\ ( ) ( ( ) )$$

$$D_1 \quad S \rightarrow SS \rightarrow (S)S \rightarrow \underline{((S))S} \rightarrow \underline{(())S} \rightarrow (())(S) \\ \text{Precedes } D_1 < D_2 \quad (())( ) \leftarrow$$

$$D_2 \quad S \rightarrow SS \Rightarrow (S)S \rightarrow \underline{(S))S} \rightarrow \underline{(SS)(S)} \rightarrow (())(S) \\ (())( ) \leftarrow$$

$$D_3 \quad S \rightarrow SS \rightarrow (S)S \rightarrow \underline{(S))S} \rightarrow \underline{(S))((S))} \rightarrow (())(S) \\ \text{Precedes } D_2 < D_3 \quad (())( ) \leftarrow$$

$$D_2 < D_3$$

$$D_1 < D_3$$

$$E \rightarrow E + E$$

$$E \rightarrow E * E \quad E \rightarrow id$$

$$\text{String } w = id + id * id$$

$$E \rightarrow E + E \rightarrow E + E * E \rightarrow E + id * E \rightarrow id + id * E \\ E + E * E \rightarrow id + E * E \rightarrow id + id * E$$