

## Attributed Translation Grammars

An attributed translation grammar is a translation grammar for which the following additional specifications are made:

- Each input, nonterminal and action symbol has an associated finite set of attributes
- Each nonterminal and action symbol attribute is classified as being either inherited – evaluated from the top down (or across the tree), or synthesized – evaluated from the bottom up
- For each occurrence of an inherited attribute on the right-hand side of a given production, there is an associated rule which describes how to compute a value for that attribute as a function of certain other attributes of symbols occurring in the left or right-hand sides of the given production
- An initial value is specified for each inherited attribute of the starting nonterminal symbol
- For each occurrence of a synthesized nonterminal attribute on the left-hand side of a given production, there is an associated rule which describes how to compute a value for that attribute as a function of certain other attributes of symbols occurring in the left or right-hand sides of the given production
- For each synthesized action-symbol attribute, there is an associated rule which describes how to compute a value for that attribute as a function of certain other attributes of the action symbol

The atom strings produced during the attributed translation of arithmetic expressions should have the following properties:

- Each binary operation in the input sequence should be represented by an atom
- The atoms in the atom string should appear in the same order as the operations are to be performed at execution time
- Each atom should have three pointers to the symbol—table: two for the operands and one for the (partial) result