Ch4 Syntax Directed Definition

* Parse tree showing values of attributes of each node is called annotated parse tree

* CFG in which the productions are shown along with its associated semantic rules is called as syntax-directed definition.

* Attribute grammar is a special form of CFG where some additional information is appended to one or more of its non-terminals in order to provide context-sensitive information.

* Synthesized   Inherited
    Attributes   Attributes

Differentiation between Synthesized Attributes and Inherited Attributes:

Sr. No.	Synthesized Attributes	Inherited Attributes
1.	An attribute is said to be synthesized attribute if its parse tree node value is determined by the attribute value at child nodes.	An attribute is said to be inherited attribute if its parse tree node value is determined by the attribute value at parent and/or siblings node.
2.	The value of the translation of the non-terminal on the left side of the production as a function of translation of non-terminal on the right-hand side (RHS) is called a synthesized attribute (translation).	Translation of a non-terminal on right-hand side of a production is determined in terms of a non-terminal on the left-hand which side is called an inherited attribute.
3.	A synthesized attribute at node n is defined only in terms of attribute values at the children of n itself.	A Inherited attribute at node n is defined only in terms of attribute values of n's parent, n itself, and n's siblings.
4.	Synthesized attributes pass on information up the parse tree.	Inherited attributes pass on information down the parse tree.
5.	Synthesized attributes can be contained by both the terminals and non-terminals.	Inherited attributes can't be contained by both but it is only contained by non-terminals.
6.	S-attributes are also called reference attributes (call by reference).	Inherited attributes are called value attributes (call by value).
7.	Example: $E \rightarrow E_1 + E_2$ ($E.val = E_1.val + E_2.val$) Semantic action enclosed in parentheses states that translation in Left-Hand Side (LHS) of production is determined by adding together translations associated on RHS of production.	Example: $A \rightarrow XYZ$ ($Y.val = 2*A.val$) States that the translation in RHS is determined by translation associated with LHS of production.

* A syntax directed translation is called s-attributed if all its attributes are synthesized

* L-Attributed Definitions contain both synthesized and inherited attributes.