

# CD Moodle Assignment 4

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## 1. Explain about S-attributed definition and L-attributed definitions.

Ans 1:

- Attributes are properties associated with grammar symbols. Attributes can be numbers, strings, memory locations, data types, etc.
- SDD (Syntax Directed Definitions) are a generalization of context-free grammars in which here grammar symbols have an associated set of attributes.
- There are two types of SDD representation
  - S - attributed: These SDDs use only synthesized attributes.
    - In the following example `s`, `x` and `p` are synthesised attributes (`value = s | x | p` respectively).

Grammar	S - attributed SDD
<code>A → BCD</code>	<code>{A.value = B.s, C.x, D.p}</code>

- L - attributed: These SDDs use both inherited & synthesised attributes.
  - In the following example `i` is an inherited attribute.

Grammar	L - attributed SDD
<code>A → BCD</code>	<code>{C.i = A.i, B.i, D.i}</code>

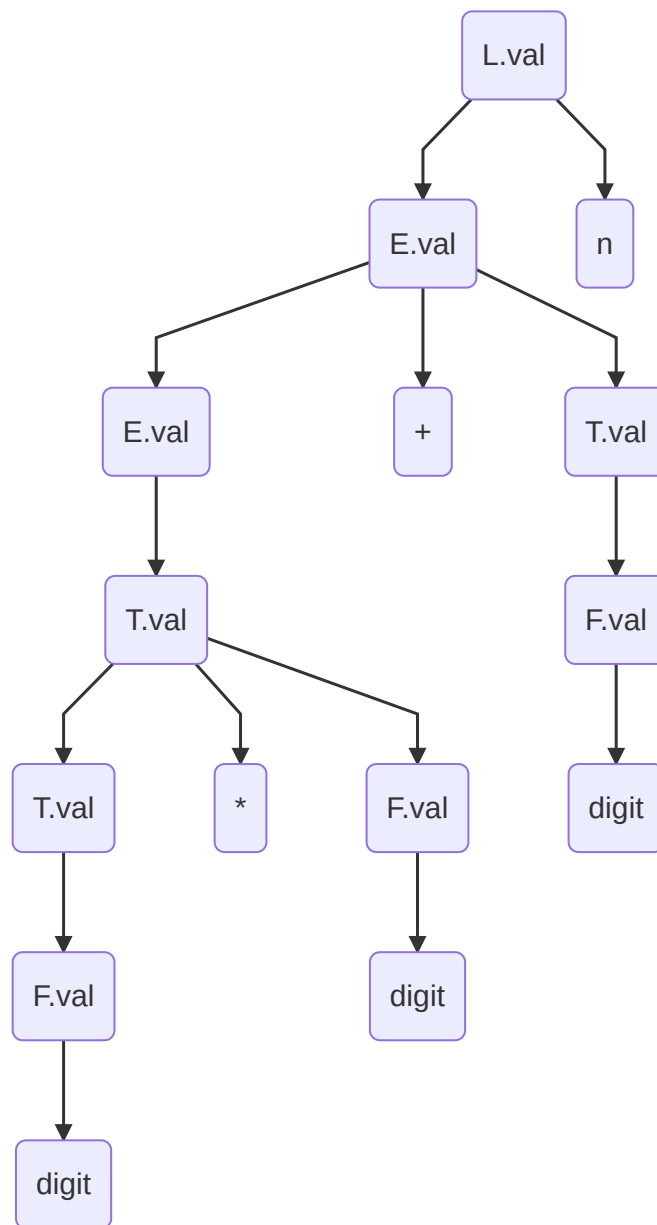
## 2. Write SDD for desk calculator.

Ans 2:

An SDD for a desk calculator will be:

Production	Semantic Rules
<code>L → E n</code>	<code>L.val = E.val</code>
<code>E → E + T</code>	<code>E.val = E.val + T.val</code>
<code>E → T</code>	<code>E.val = T.val</code>
<code>T → T * F</code>	<code>T.val = T.val * F.val</code>
<code>F → ( E )</code>	<code>F.val = E.val</code>
<code>F → digit</code>	<code>F.val = digit.lexval</code>

So the corresponding annotated parse tree will be:



**3. Write SDD for infix to post fix translation and convert 2 + 3 \* 4 to postfix notation.**

**Ans 3:**

Given: input string: 2 + 3 \* 4

The required grammar can be written as:

$$E \rightarrow E + T$$

$$E \rightarrow T$$

$$T \rightarrow T * F$$

$$F \rightarrow \text{num}$$

Therefore using infix to postfix conversion

