

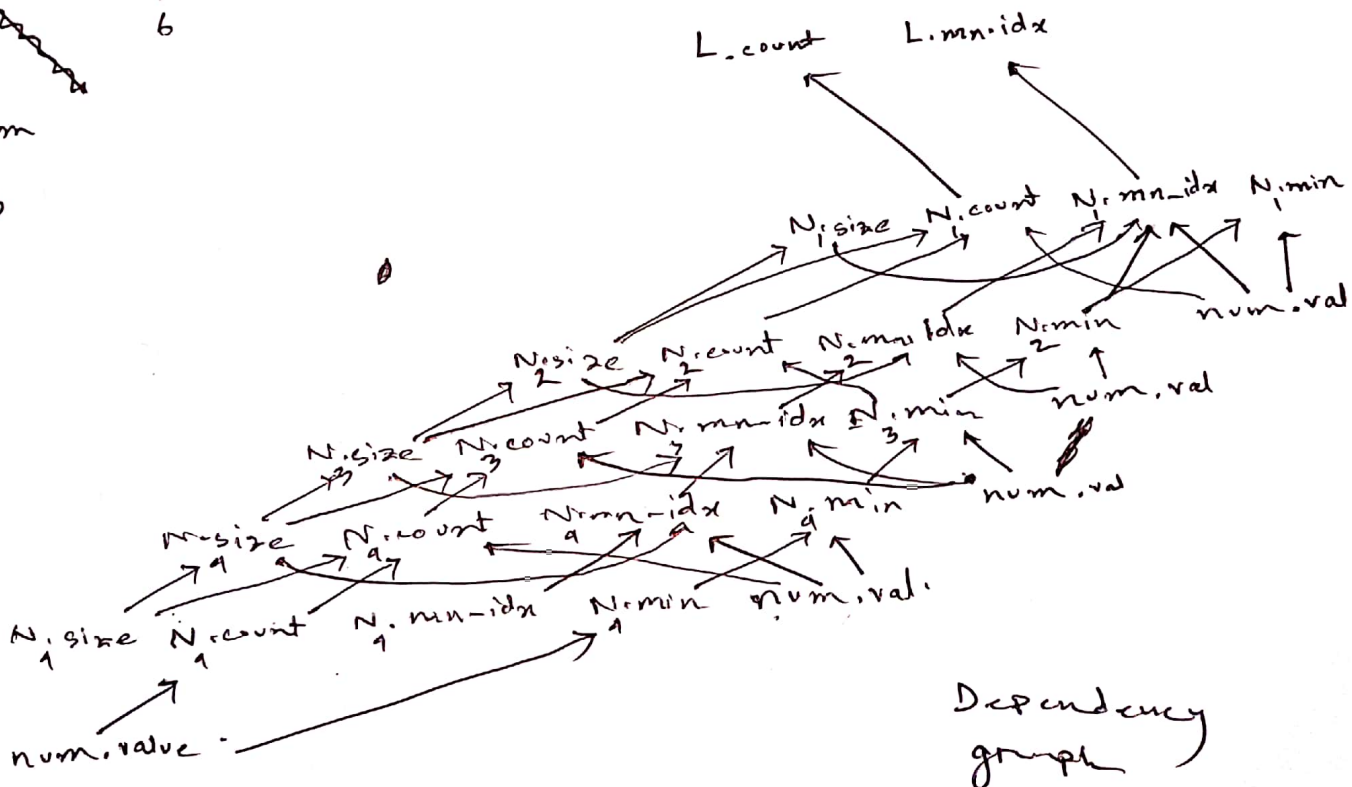
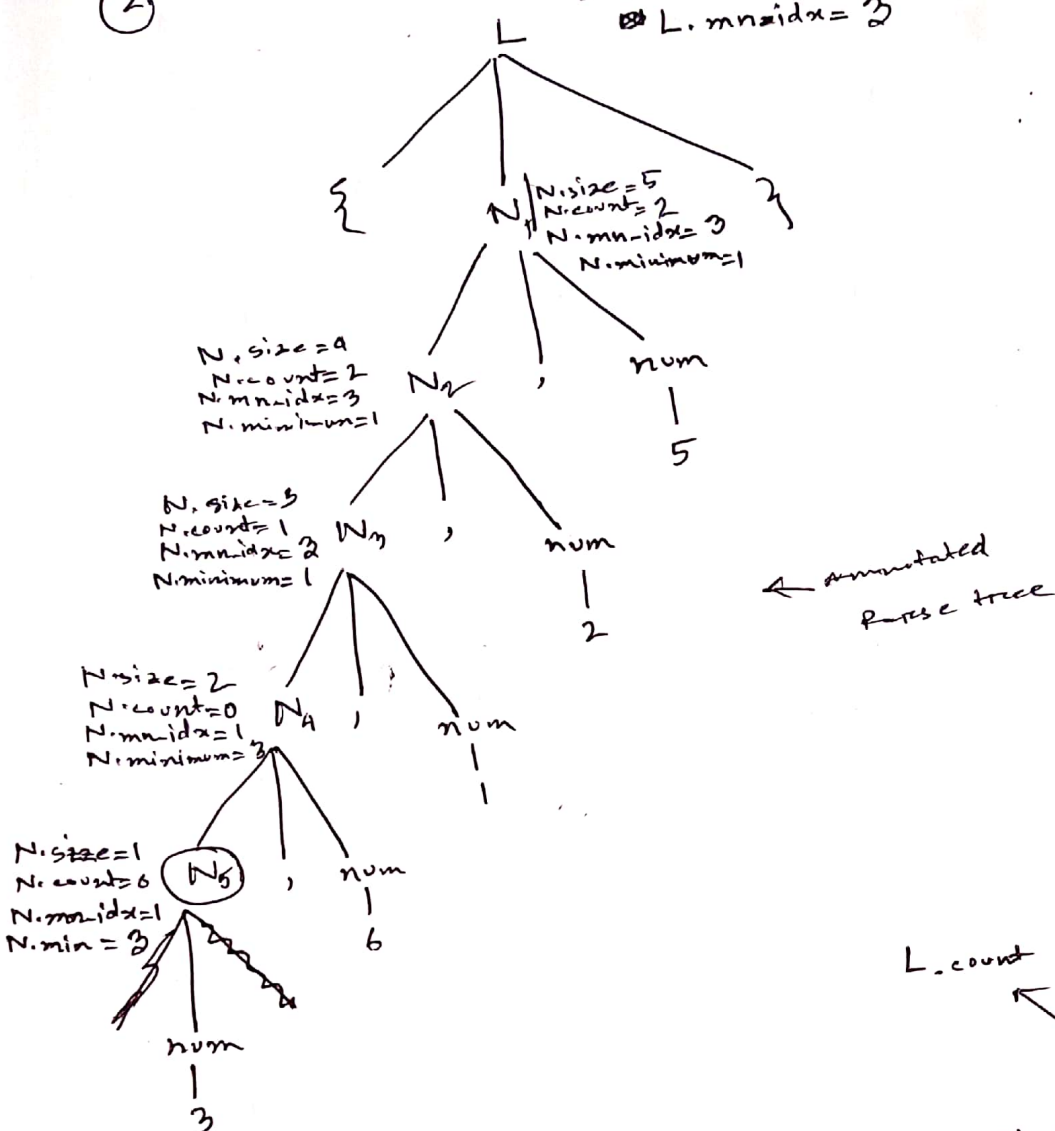
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①. Production	Semantic rule
$L \rightarrow \{ N \}$ $N \rightarrow N', \text{num}$	$N.\text{idx} = 1$ $N.L.\text{count} = N.\text{count}$ $L.\text{mn_idx} = N.\text{mn_idx}$
$N \rightarrow N', \text{num}$	$N.\text{count} = N_1.\text{count} + \begin{cases} 0; & \text{if } \text{num.value} > N_1.\text{size} + 1 \\ 1; & \text{else} \end{cases}$ $N.\text{size} = N_1.\text{size} + 1$ $N.\text{mn_idx} = \begin{cases} N_1.\text{mn_idx}; & \text{if } N_1.\text{minimum} \leq \text{num.value} \\ N.\text{size}; & \text{else} \end{cases}$ $N.\text{minimum} = \min(N_1.\text{minimum}, \text{num.value})$
$N \rightarrow \text{num}$	$N.\text{size} = 1$ $N.\text{count} = \begin{cases} 0; & \text{if } \text{num.value} \geq 1 \\ 1; & \text{else} \end{cases}$ $N.\text{mn_idx} = 1$ $N.\text{minimum} = \text{num.value}$

(2)

$L.count = 2$
 $L.mn.idx = 3$



③

SPT

As all rule are S-attribute, we simply add add rules in last.

$$L \rightarrow \{ N \} \quad \left\{ \begin{array}{l} L.count = N.count; \\ L.mn-idx = N.mn-idx \end{array} \right\}$$

$$N \rightarrow N_1 ; num \quad \left\{ \begin{array}{l} N.count = N_1.count + \begin{cases} 0, & \text{if } num.value \geq N_1.size + 1; \\ 1, & \text{else} \end{cases} \end{array} \right\}$$

$$N.size = N_1.size + 1;$$

$$N.mn-idx = \begin{cases} N_1.mn-idx; & \text{if } N_1.mn-idx \leq num.value; \\ N.size; & \text{otherwise} \end{cases}$$

$$N.minimum = \min(N_1.minimum, num.value)$$

}

$$N \rightarrow num \quad \left\{ \begin{array}{l} N.size = 1; \\ N.count = \begin{cases} 0, & \text{if } num.value \geq 1; \\ 1, & \text{else} \end{cases} \\ N.mn-idx = 1; \\ N.minimum = num.value; \end{array} \right\}$$