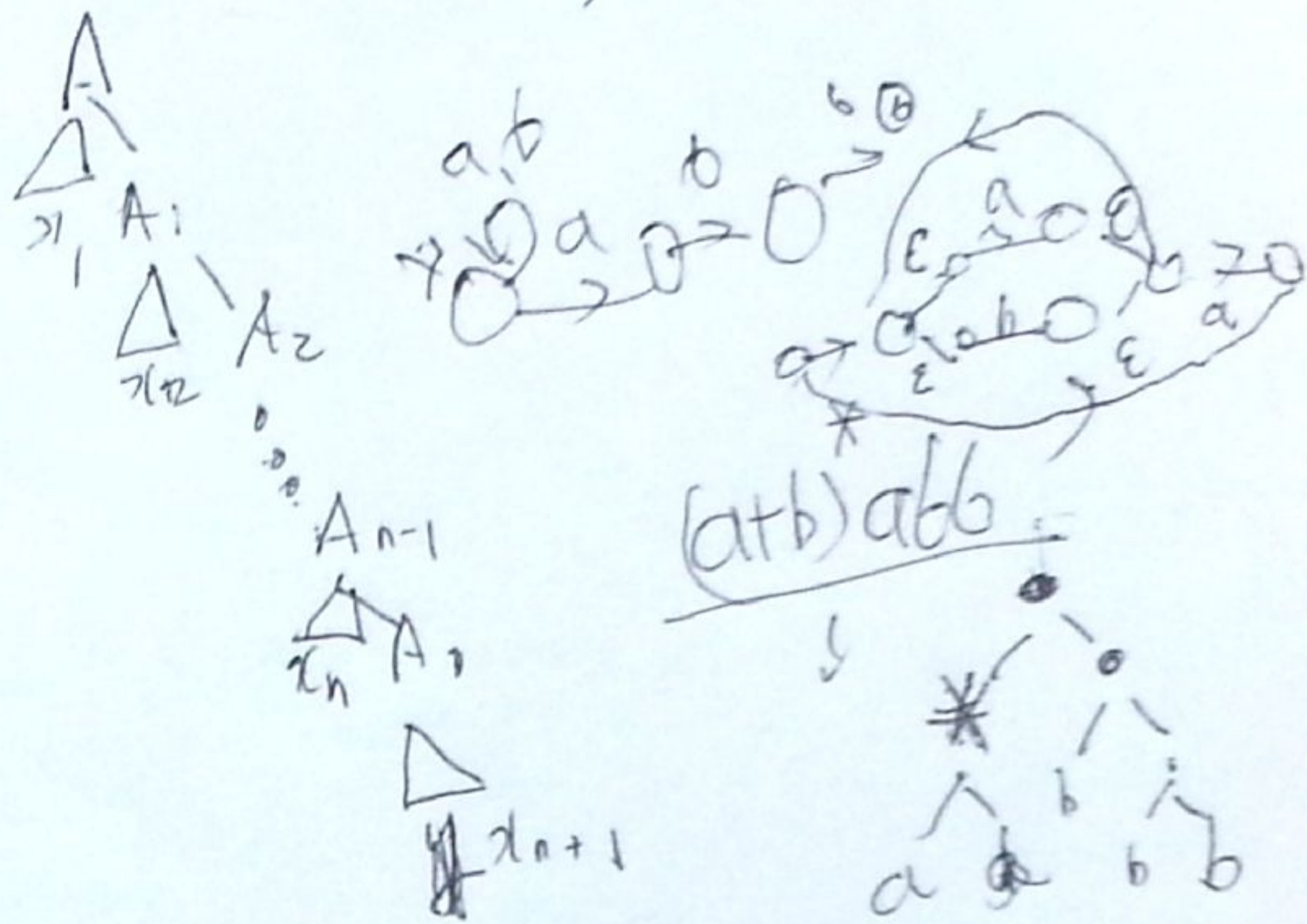


4/2(2) 제4장 Context-free languages

type 3 r.g.  $A \rightarrow xB$  or  $A \rightarrow y \in P$   $A, B \in N, x, y \in \Sigma^*$

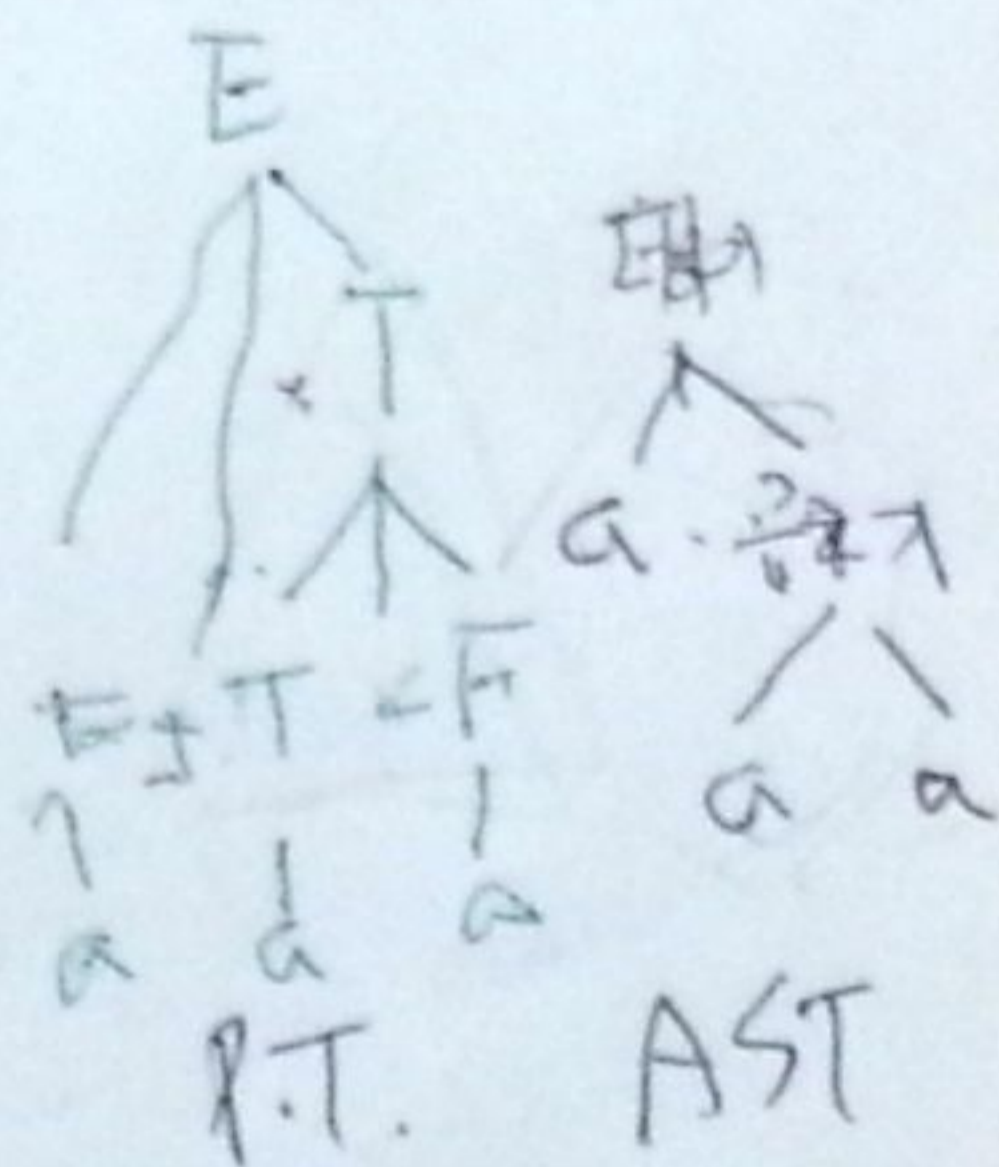
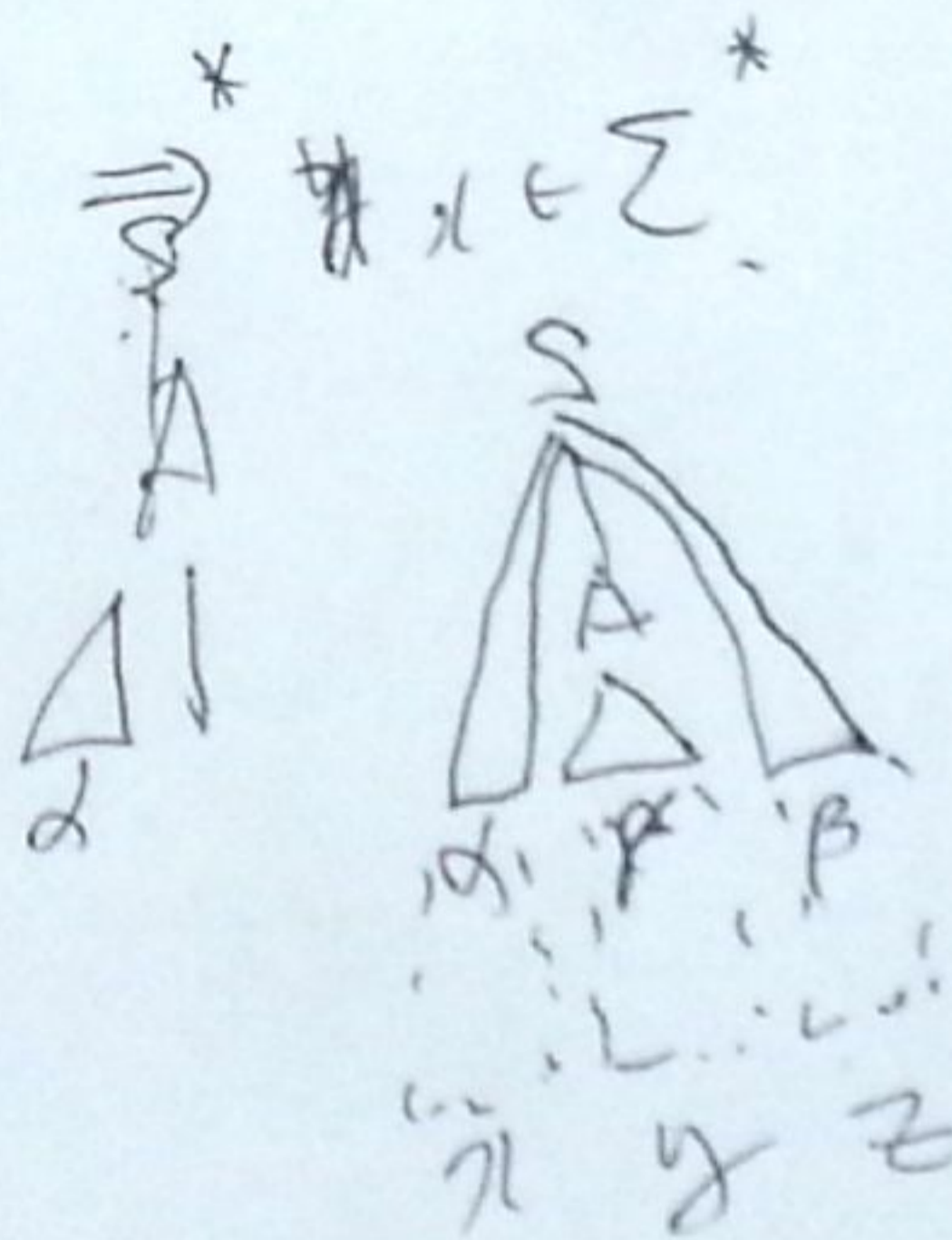
linear structure



type 2 cfg  $A \rightarrow \alpha \in P$   $A \in N, \alpha \in V^* = (N \cup \Sigma)^*$  AST

$S \Rightarrow^* \alpha A \beta \Rightarrow^* \alpha \gamma \beta \Rightarrow^* x \in \Sigma^*$

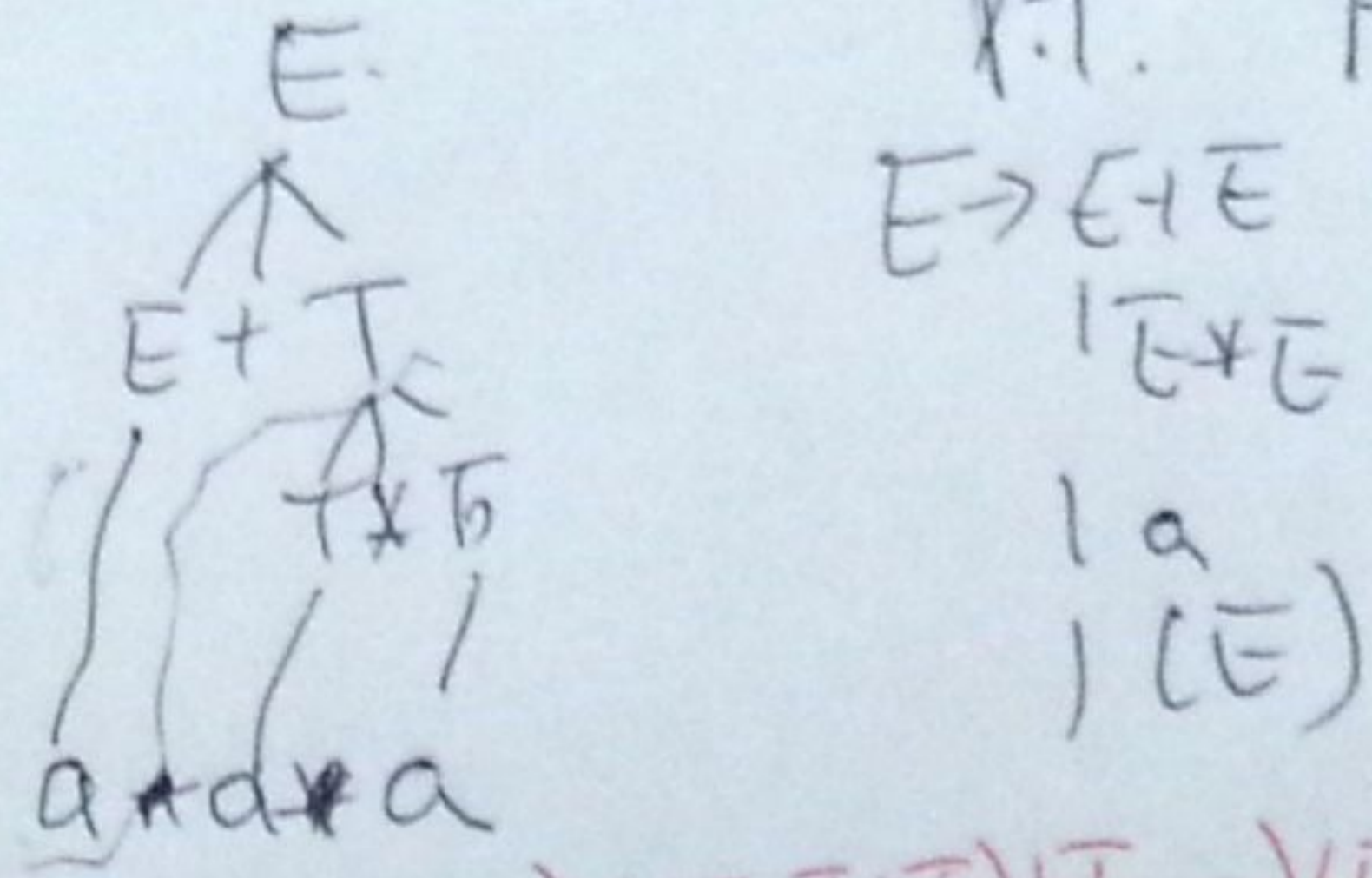
hierarchial structure  $A \rightarrow \gamma \in P$



$\{0^n 1^n \mid n \geq 0\}$

$S \rightarrow 0S1 \mid \epsilon$  vs  $S \rightarrow 0S1 \mid 01$   
 $n \geq 0$   $n \geq 1$

$E \rightarrow E+T \mid T * F \mid a \mid (E)$   
 $T \rightarrow T * F \mid a \mid (E)$   
 $F \rightarrow a \mid (E)$   
 $E \rightarrow$

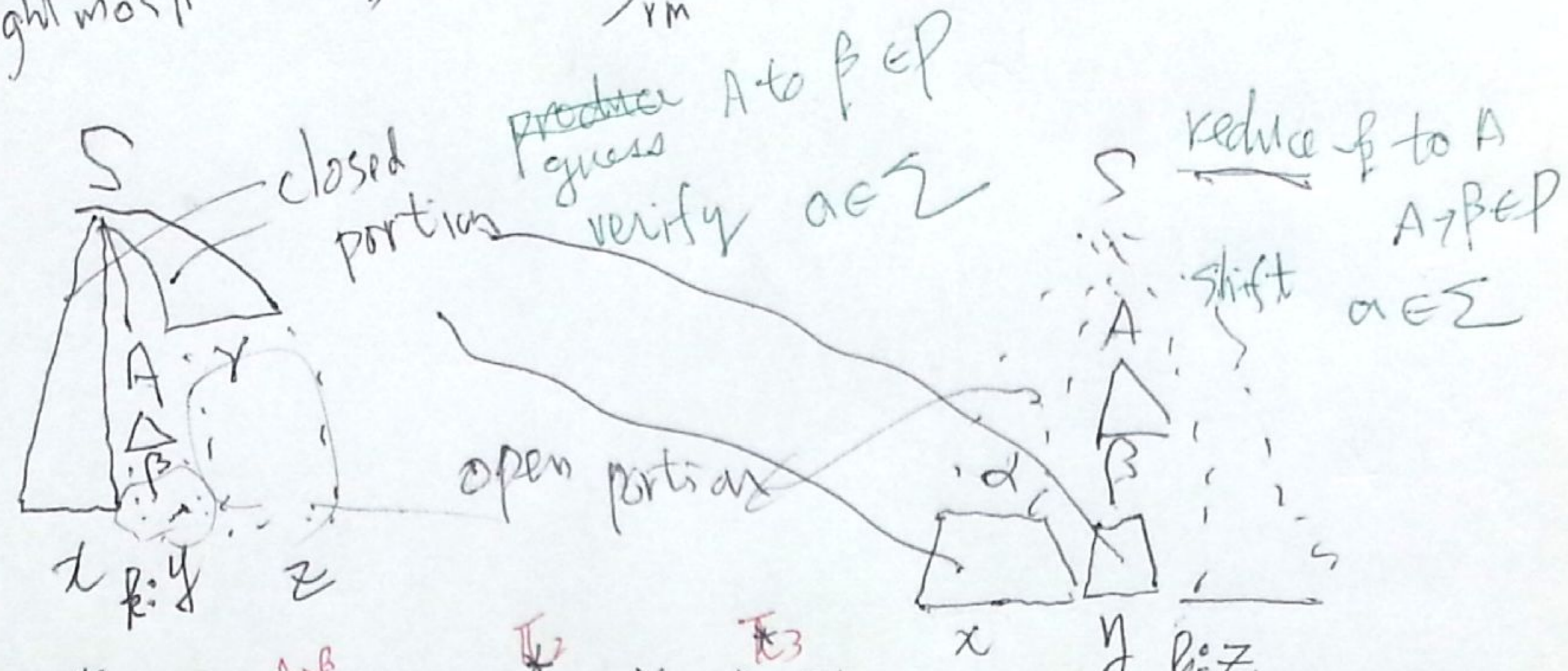


$(E \rightarrow E+T) (E \rightarrow a) (T \rightarrow T * F) (T \rightarrow a) (F \rightarrow a)$   
 $(F \rightarrow E+T) (T \rightarrow T * F) (F \rightarrow a) (T \rightarrow a) (E \rightarrow a)$

3/ 비어있는 Nonterminal 순서.

leftmost derivation  $\Rightarrow_{lm}$

rightmost "  $\Rightarrow_{rm}$



$$S \xrightarrow[\pi_1]{*} xAy \xrightarrow[\pi_2]{A \rightarrow \beta} x\beta y \xrightarrow[\pi_3]{*} x\beta z$$

$x, y, z \in \Sigma^+, A \rightarrow \beta \in P$

$\pi_1 \circ A \rightarrow \beta \circ \pi_2 \circ \pi_3 \in P^*$   
left parse

Top-down parsing

lm 순서와 같다

math dual  
LR(k)  
left-to-right scan  
in leftmost derivation  
using k-lookahead symbol  
LR(k)

$$xyz \xleftarrow[\pi_1]{*} \alpha yz \xleftarrow[\pi_2]{*} \alpha \beta z$$

$\leftarrow \alpha A z \leftarrow S$   
 $\pi_1 \pi_2 A \rightarrow \beta \pi_3$   
left parse

Bottom-up parse.

(rm 순서의 역순)

math left-to-right scan  
dual in the reversed order of  
(rightmost derivation)  
k-lookahead symbol  
RL(k)

3) Lemma 4.1 (4.6)

