

Chomsky Normal Form & Pumping Lemma

① Useless symbol ~~문제 해결~~

CFG $G = (N, \Sigma, P, S)$

$A \rightarrow \alpha \in P$ $A \in N, \alpha \in (N \cup \Sigma)^*$
 간단하게 ... normal form (필요 없음)
 간략

Regular Grammar
$A \rightarrow x$ or xB
$A \in N, x \in \Sigma^*, B \in N$
$A \rightarrow a$ or aB
$A, B \in N, a \in \Sigma$

$A \rightarrow BC$ or $A \rightarrow a$ $A, B, C \in N, a \in \Sigma$
 except $S \rightarrow \epsilon$.

CFG \Rightarrow CNF

1 Useless symbol 필요 없는 ~~문~~ 문제 해결

? \rightarrow 한번도 나오지 않는 ~~문~~ $X \in N \cup \Sigma$

$S \Rightarrow \alpha \beta$ $\Rightarrow W \in \Sigma^*$
 ① $X \Rightarrow \alpha$ $X \in N \cup \Sigma, \alpha \in \Sigma^*$ 필수 불가!

- i) $X \in \Sigma$ Term Σ
- ii) $X \in N$
 $X \rightarrow Y_1 \dots Y_n$ 이면 Σ

$X \Rightarrow \alpha$

$\forall 1 \leq i \leq n : X_i \in \text{Term} \Rightarrow X \in \text{Term}$

See Ex 7.3 & Thm 7.4 ~~문제~~

프러머 p264-265

② $S \Rightarrow \alpha X \beta$ $\alpha, \beta \in (N \cup \Sigma)^*$
 $\stackrel{VS}{=} S \Rightarrow u X v$ $u, v \in \Sigma^*$
 $A \rightarrow \alpha X \beta \in P, \text{ if } A \text{ is } X \text{ then } \alpha \in (N \cup \Sigma)^* X (N \cup \Sigma)^*$

② ϵ -free, unit-product-free 2LR, CNF

② ϵ -rule
 ① $A \rightarrow \epsilon$
 ② $A \Rightarrow^* \epsilon$

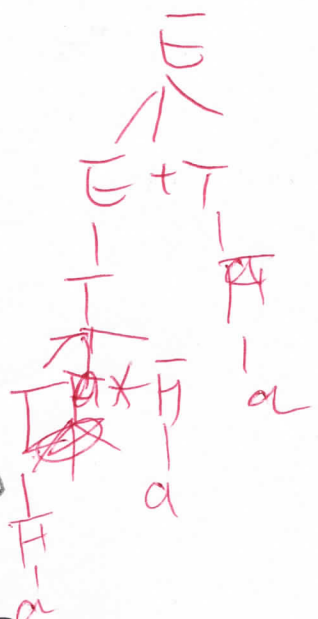
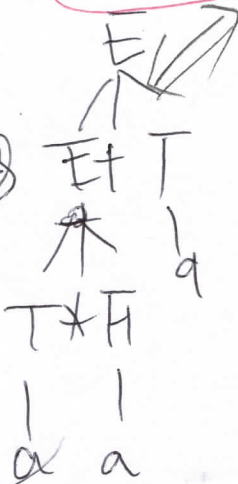
$A \in \epsilon$ -rule
 ① $A \rightarrow \epsilon \in P$
 ② $\exists i \leq n: A \rightarrow x_1 \dots x_n \quad x_i \in \epsilon$ -rule
 $\downarrow \Rightarrow A \in \epsilon$ -rule

③ Unit Production

$A \rightarrow B \in P$

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

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



① $A \Rightarrow^* \alpha \in \Sigma^*$
 ② $A \Rightarrow^* \epsilon \in \Sigma^*$ except $S \rightarrow \epsilon \in P$

③ $A \Rightarrow^* B$

⑤ $A \rightarrow \alpha \in P \quad \alpha \in N^*$

$|\alpha| \geq 2$

길이 둘 이상

$a \in \Sigma^2$
 $A a \in N^2$ 바꾸기
 $A a \rightarrow a \in P$ (타하기)