

Exercise 7.1.1

Find a grammar equivalent to

$$S \rightarrow AB \mid CA$$

$$A \rightarrow a$$

$$B \rightarrow BC \mid AB$$

$$C \rightarrow aB \mid b$$

With no useless symbols.

Basic : $A \rightarrow a$

$$C \rightarrow a \mid b$$

\Rightarrow A dan C berguna

Induksi : S teridentifikasi berguna krn $S \rightarrow CA$

$$S \rightarrow a \mid b$$

Hasil : $S \rightarrow CA$

$$A \rightarrow a$$

$$C \rightarrow b$$

Exercise 7.1.2

Begin with the grammar:

$$S \rightarrow ASB \mid \epsilon$$

$$A \rightarrow aAS \mid a$$

$$B \rightarrow SbS \mid A \mid b$$

a) Eliminate ϵ -production

Basic : S adlh nullable ($S \rightarrow \epsilon$)

A, B tdk nullable

Hasil : $S \rightarrow ASB \mid AB$

$$A \rightarrow aAS \mid aA \mid a$$

$$B \rightarrow SbS \mid bS \mid Sb \mid A \mid b \mid b$$

b) Eliminate semua unit productions

Unit production : $B \rightarrow A$

Hasil : $S \rightarrow ASB \mid AB$

$$A \rightarrow aAS \mid aA \mid a$$

$$B \rightarrow SbS \mid bS \mid Sb \mid b \mid b \mid aAS \mid aA \mid a$$

c) Eliminate useless symbols

Base: A dan B berguna kkn $A \rightarrow a$

$B \rightarrow b|b|a$

Induksi: S berguna kkn $S \rightarrow ASB|AB$

\therefore Tak ada useless symbol, grammar tdk berubah.

d) CNF

Introduce $C \rightarrow A$ dan $D \rightarrow b$

$S \rightarrow ASB|AB$

$A \rightarrow CAS|CA|a$

$B \rightarrow SDS|DS|SD|b|CAS|CA|ab$

$C \rightarrow a$

$D \rightarrow b$

Split CAS , ASB , SDS

$S \rightarrow AE|AB$

$A \rightarrow CF|CA|a$

$B \rightarrow SG|DS|SD|b|CF|CA|a|DD$

$C \rightarrow a$ $E \rightarrow SB$ $G \rightarrow DS$

$D \rightarrow b$ $F \rightarrow AS$

Exercise 7.4.3

Using grammar G of ex 7.34, use the CYK algorithm to determine whether each of the following strings in $L(G)$:

a) ababa

C, A, S				
B	B			
B	S, C	B		
S, C	A, S	S, C	A, S	
A, C	B	A, C	B	A, C
a	b	a	b	a

\therefore "ababa" terdapat pd $L(G)$

c) aabab

S, C				
C, A, S	B			
B	B	S, C		
B	S, C	A, S	S, C	
A, C	A, C	B	A, C	B
a	a	b	a	b

\therefore "aabab" terdapat pd $L(G)$

b) baaab

S, C				
A, S, C	S, C			
-	S, A, C	B		
A, S	B	B	S, C	
B	A, C	A, C	A, C	B
b	a	a	a	b

\therefore "baaab" terdapat pd $L(G)$