PR 9 TBFO

Wednesday, November 29, 2023   2:15 AM

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* Exercise 7.1.1 : Find a grammar equivalent to

$$
\begin{aligned}
S &\rightarrow AB \mid CA \\
A &\rightarrow a \\
B &\rightarrow BC \mid AB \\
C &\rightarrow aB \mid b
\end{aligned}
$$

7.1.1

B dihilangkan

$$S \longrightarrow CA$$
$$A \longrightarrow a$$
$$C \longrightarrow b$$

* Exercise 7.1.2 : Begin with the grammar:

$$
\begin{aligned}
S &\rightarrow ASB \mid \epsilon \\
A &\rightarrow aAS \mid a \\
B &\rightarrow SbS \mid A \mid bb
\end{aligned}
$$

a) Eliminate ϵ-productions.

$$S \rightarrow ASB \mid AB$$
$$A \rightarrow aAS \mid aA \mid a$$
$$B \rightarrow SBS \mid bS \mid Sb \mid b \mid A \mid bb$$

b) Eliminate any unit productions in the resulting grammar.

$$S \rightarrow ASB \mid AB$$
$$A \rightarrow aAS \mid aA \mid a$$
$$B \rightarrow SbS \mid bS \mid Sb \mid b \mid aAS \mid aA \mid a \mid bb$$

c) Eliminate any useless symbols in the resulting grammar.

Tidak ada simbol yang tidak berguna

$$S \rightarrow ASB \mid AB$$
$$A \rightarrow aAS \mid aA \mid a$$
$$B \rightarrow SbS \mid bS \mid Sb \mid b \mid aAS \mid aA \mid a \mid bb$$

d) Put the resulting grammar into Chomsky Normal Form.

Agar semua terminal berbentuk $A \to a$

$S \to ASB \mid AB$
$A \to CAS \mid CA \mid a$
$B \to SDS \mid DS \mid b \mid CAS \mid CA \mid a \mid DD$
$C \to a$
$D \to b$

Agar semua berbentuk $A \to BC$

$S \to AE \mid AB$
$A \to CF \mid CA \mid a$
$B \to SG \mid DS \mid b \mid CF \mid CA \mid a \mid DD$
$C \to a$
$D \to b$
$E \to SB$
$F \to AS$
$G \to DS$

Exercise 7.4.3: Using the grammar G of Example 7.34, use the CYK algorithm to determine whether each of the following strings is in $L(G)$:

* a) *ababa.*

$$
\begin{array}{lllll}
\{S,C,A\} \\
\{B\} & \{B\} \\
\{B\} & \{S,C\} & \{B\} \\
\{S,C\} & \{S,A\} & \{S,C\} & \{S,A\} \\
\{A,C\} & \{B\} & \{A,C\} & \{B\} & \{A,C\} \\
\hline
a & b & a & b & a
\end{array}
$$

1) Diterima

b) *baaab.*

$$
\begin{array}{lllll}
\{C,S\} \\
\{A,C,S\} & \{C,S\} \\
— & \{A,C,S\} & \{B\} \\
\{A,S\} & \{B\} & \{B\} & \{S,C\} \\
\{B\} & \{A,C\} & \{A,C\} & \{A,C\} & \{B\} \\
\hline
\end{array}
$$

| --- | --- | --- | --- | --- |
| a | b | a | b | a |

Diterima

c) *aabab.*

{S,C}				
{S,C,A}	{B}			
{B}	{B}	{S,C}		
{B}	{S,C}	{S,A}	{S,C}	
{A,C}	{A,C}	{B}	{A,C}	{B}
a	b	a	b	a

Diterima