Tutoriaal 5

Rekenaarwetenskap 324
Teoretiese Rekenaarwetenskap

17 Maart 2004

Doel van Tutoriaal

Die volgende onderwerpe word in hierdie tutoriaal aangespreek:

- Ambiguity
- Chomsky Normal Form
- Cocke-Kasami-Younger Algorithm
- Pumping Lemma for CFL's

Ambiguity

Vraag 1

Show that the following CFL is ambiguous by giving two leftmost derivations and two different parse trees for:

if b **then if** b **then** a **else** a

Rules for Grammar:

$S \rightarrow$ **if** b **then** S **else** $S \mid$ **if** b **then** $S \mid a$

S is the only variable (non-terminal).
if, **then**, **else**, a, b are the terminals.

Chomsky Normal Form

Vraag 2

Give a grammar in Chomsky normal form for $\{a^n b^k a^n | k, n \geq 0\}$.

Cocke-Kasami-Younger Algorithm

Vraag 3

Using the grammar $S \to AB$, $A \to a$, $B \to AB \mid b$, run the CKY algorithm on the string aab.

Vraag 4

Using the grammar $S \to RT$, $R \to TR \mid a$, $T \to TR \mid b$, run the CKY algorithm on the string $baba$.

Pumping Lemma for CFL's

Vraag 5

Sipser, exercise 2.18 (b).

Vraag 6

Sipser, exercise 2.18 (c).

Slightly more difficult problems

Vraag 7

Sipser, exercise 2.15.

Vraag 8

Sipser, exercise 2.16.

Vraag 9

Sipser, exercise 2.19.