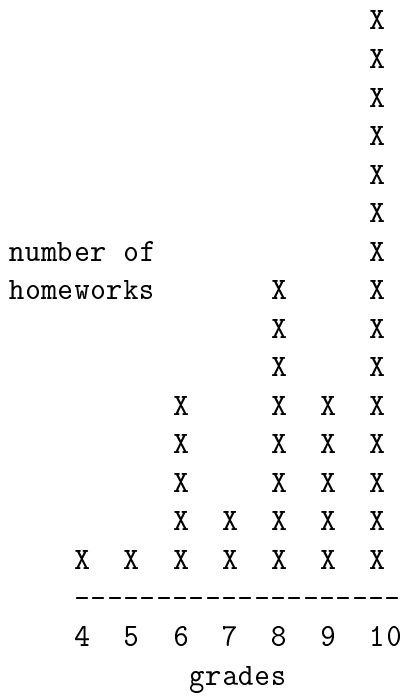
Automata Theory: Solutions 9



Problem 1
Give Chomsky and Greibach normal forms for this grammar:

$S \to AB$
$A \to aAa \mid a$
$B \to Bb \mid b$

Chomsky normal form:

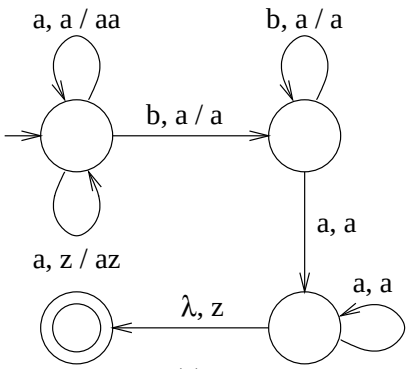
$S \to AB$
$A \to CX \mid a$
$C \to XA$
$B \to BY \mid b$
$X \to a$
$Y \to b$

Greibach normal form:

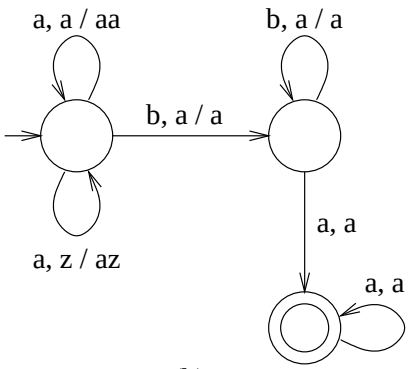
$S \to aAB \mid aB$
$A \to aXA \mid aX$
$B \to bB \mid b$
$X \to a$

Problem 2
Construct deterministic PDAs for the following languages:

(a) $\{a^n b^m a^n : n \geq 1 \text{ and } m \geq 1\}$
(b) $\{a^n b^m a^k : 1 \leq k \leq n \text{ and } m \geq 1\}$



(a)



(b)