

Theory of Computer Science

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Exercise meeting 5

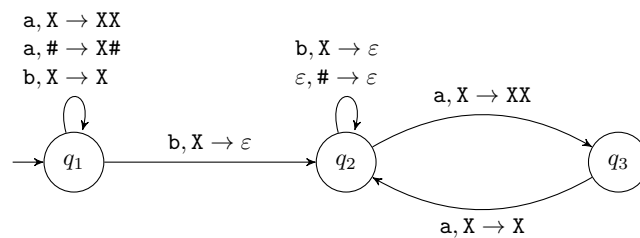
Exercise 5.1

Specify a grammar G' in Chomsky normal form that generates the same language as the context-free grammar $G = (\Sigma, V, P, S)$ with $\Sigma = \{a, b\}$, $V = \{S, X, Y, Z\}$ and the following rules in P :

$$\begin{array}{lllll} S \rightarrow \varepsilon & S \rightarrow XZ & S \rightarrow Y & X \rightarrow Z & X \rightarrow aYa \\ Y \rightarrow bb & Y \rightarrow bY & Z \rightarrow X & Z \rightarrow bZ & \end{array}$$

Exercise 5.2

- (a) Consider the PDA $M = (\{q_1, q_2, q_3\}, \{a, b\}, \{X, \#\}, \delta, q_1, \#)$ with the following transition function δ :



Prove that M accepts the word **aababbaabb** by specifying a sequence of configurations as defined in chapter C5.

- (b) Specify a PDA that accepts the language $L = \{(ab)^n ca^n \mid n \geq 0\}$ over $\Sigma = \{a, b, c\}$.