Chapter 6

下推自动机

1. [Exercise 6.2.1] Design a PDA to accept each of the following languages. You may accept either by final state or by empty stack, whichever is more convenient.

   a) $\{0^n 1^n \mid n \geq 1\}$

   b) The set of all strings of 0’s and l’s such that no prefix has more l’s than 0’s.

   [illegible] 前缀

   c) The set of all strings of 0’s and 1’s with an equal number of 0’s and 1’s.

2. [Exercise 6.2.2] Design a PDA to accept each of the following languages.

   a) $\{a^i b^j c^k \mid i = j \text{ or } j = k\}$.

b) The set of all strings with twice as many 0's as 1's.

3. [Exercise 6.2.3] Design a PDA to accept each of the following languages.

   a) $\{a^i b^j c^k \mid i \neq j \text{ or } j \neq k\}$.

   b) The set of all strings of a's and b's that are *not* of the form ww, that is, not equal to any string repeated.

4. [Exercise 6.3.5] Below are some context-free languages. For each, devise a PDA that accepts the language by empty stack. You may, if you wish, first construct a grammar for the language, and then convert to a PDA.

   a) $\{a^n b^m c^{2(n+m)} \mid n \geq 0, m \geq 0\}$.

   b) $\{a^i b^j c^k \mid i = 2j \text{ or } j = 2k\}$.

   c) $\{0^n 1^m \mid n \leq m \leq 2n\}$

   d) $\{0^n 1^m \mid n < m < 2n\}$

? 5. [Exercise 6.3.6] Show that if P is a PDA then there is a one-state PDA P_1 such that $N(P_1) = N(P)$.

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6. Construct pushdown automata for the following languages. Acceptance either by empty stack or by final state.

   (a) $\{a^n b^m a^n \mid m, n \in \mathbf{N}\}$

   (b) $\{a^n b^m c^m \mid m, n \in \mathbf{N}\}$

   (c) $\{a^i b^j c^k \mid i, j, k \in \mathbf{N},\ i > j\}$

   (d) $\{a^i b^j c^k \mid i, j, k \in \mathbf{N},\ i + j = k\}$

   (e) $\{a^i b^j c^k \mid i, j, k \in \mathbf{N},\ i + k = j\}$

7. Design a PDA for $L = \{wxw^R \mid w, x \in \{0,1\}^* \text{ and } |x| = 2\}$.