

## Chapter 6

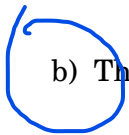
### 下推自动机

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 1's such that no prefix has more 1's than 0's.



字符串

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  $N(P_1) = N(P)$ .

CTG



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

