

CS 273: Intro to Theory of Computation, Fall 2007

Head-banging 5 (10-12 Oct)

1. CFG Design:

Design context-free grammars for the language $L = \{a^i b^j c^k \mid i \neq j \text{ or } j \neq k\}$. (i.e., there must be a different number of b 's and a 's, or a different number of a 's and c 's, or both.)

2. PDA Tracing:

Let us consider the classic example context-free language w, w -reverse, that is the language $L = \{ww^R \mid w \in \{0, 1\}^*\}$. Here is a partial PDA:

$$P = (\{q_0, q_1, q_2\}, \{0, 1\}, \{0, 1, \$\}, \delta, q_0, \{q_2\})$$

(a) Define the transition function δ .

(b) Tracing through the input string "110011":

- i. What are the possible states and stack configuration when reading the second character '1' in the input string?
- ii. What are the possible states and stack configuration when reading the fifth character '1' in the input string?

3. PDA Design:

Design a PDA to accept the language $L = \{w \mid w \text{ is not of the form } a^n b^n\}$.