Problem Set 4—Due Friday, October 27

Problem 17. Page 105, Exercise 4.

Problem 18. Page 105, Problem 1.

Problem 19.

Part A. Exhibit a context free grammar for

$$L = \{a^n b^m : n \neq 2m\}.$$

Part B. Describe a PDA for the same language.

Problem 20. Page 106, Problem 10.

Problem 21. Show that L is regular if and only if L is generated by a CFG G in which every rule is of the form $A \to Bc$ or $A \to \varepsilon$, where B is a variable and c is a terminal.

Problem 22.

Part A. Prove that $L_a = \{a^i b^j c^k : j = \max\{i, k\}\}$ is not context free.

Parg B. Prove that $L_b = \{b_i \# b_{i+1} : b_i \text{ is } i \text{ in binary}, i \geq 1\}$ is not context free.