

COMS W3261: Theoretical Computer Science.

Instructor: Tal Malkin

Problem Set 7

Due: Tue, 10/25/07

No late homework will be accepted.

Note: This homework is shorter than usual, and will only count as **half** a homeork

Reading: Chapter 2.3

Prove that the following languages are not context free:

1. (10 points) $L_1 = \{a^n b^n a^n b^n | n \geq 0\}$ over $\{a, b\}$.
2. (10 points) $L_2 = \{a^{n^2} | n \geq 0\}$ over $\{a\}$.
3. (10 points) $L_3 = \{w | \text{the number of } a\text{'s in } w \text{ equals the number of } b\text{'s in } w, \text{ and the number of } c\text{'s in } w \text{ equals the number of } d\text{'s in } w\}$, over $\{a, b, c, d\}$.