

**CS3133**  
**HW #5**

**DUE:** Monday, October 2

1. (6 points) Show that  $L = \{a^i b^j \mid i, j \in \mathbb{N} \wedge i \neq j\}$  is not regular.
2. (10 points) Do **Exercise 14** on page 224 of our text. For each regular language that you use, show that it is regular.
3. (10 points) *a)* Describe a PDA to accept  $\{a^{2^n} b^n\}$ .  
*a)* Describe a context-free grammar to generate  $\{a^{2^n} b^n\}$ .

