

CS3350 Homework**DUE: October 20 at the start of class**

Note: homework submitted after the start of class will be considered late. Homework submitted after the end of class will be reviewed but will not be graded and the record will show that it was not submitted.

Exercise 1. For each of the following languages, prove whether or not they are regular languages:

- $L_1 = \{a^n b^+ \mid n > 0\}$
- $L_2 = \{a^n b^n \mid n > 0\}$
- L_3 is the language of palindromes over the alphabet $\{0,1\}$
- $L_4 = \{w.w \mid w \text{ is a word over alphabet } \{a,b\}\}$
- $L_5 = \{0^n 1^n 2^n \mid n > 0\}$
- $L_6 = \{0^n 1^m 2^p \mid 0 < n < m < p\}$
- $L_7 = \{a^n b^{2^n} \mid n > 0\}$

Exercise 2. For each of the following regular languages (hence “pumpable” languages), determine their smallest pumping length, i.e., the minimum length for a string to be pumpable.

- 0001^*
- 0^*1^*
- $001 \cup 0^*1^*$
- $(01)^*$
- $10(11^*0)^*0$