

## Homework 10 - Computer Science 461

*Due Monday, April 14*

1. For each of the following, determine if the statement is true or false. Briefly explain your answers.

(a)  $n^2 \in O(n)$ .

(c)  $n^3 + \sqrt{2^n} \in O(n^3)$ .

(b)  $n^2 + 3 \log n \in O(n^2 \log n)$ .

(d)  $2^{2^n} \in O(n^n)$ .

2. Let  $L = \{w \in \{a, b\}^* : w \text{ has an equal number of a's and b's}\}$ . Prove that  $L \in P$ .

3. Suppose that  $L, K \subset \{0, 1\}^*$  are languages in class P. Prove the following are also in class P.

(a) The complement of  $L$ .

(b) The union  $L \cup K$ .