Homework Assignment #5
Due: June 24, 2015 at 7:00 p.m.

1. Let $L_1 = \{\mathtt{0}^j\mathtt{1}^k\mathtt{2}^\ell : j \geq k \text{ or } j \leq \ell\}$. Is L_1 regular? Prove your answer is correct.

2. If L is a language, let $PAL(L)$ be the language consisting of all palindromes in L. More formally, $PAL(L) = \{x \in L : x = x^R\}$.

(a) Let L_2 be the language described by the regular expression $\mathtt{0}^*\mathtt{1}^*\mathtt{0}$. Give a regular expression for the language $PAL(L_2)$. You do not have to prove your answer is correct.

(b) Is the following claim true or false?
Claim: For all languages L, if L is regular, then $PAL(L)$ is regular.
Prove your answer is correct.