Homework Assignment #5
Due: November 3, 4:00 p.m.

1. Recall (from Exercise 1) that for any string x, x^R denotes the reverse of x (i.e., the string obtained by taking the characters of x in reverse order). For any language L, let $MIRROR(L) = \{xx^R : x \in L\}$. For example, if $L = \{ko, be, \varepsilon\}$, then $MIRROR(L) = \{kook, beeb, \varepsilon\}$.

    (a) Explain why $MIRROR(L)$ is not the same as LL^R. (L^R was also defined in exercise 1.)

    (b) Is the class of regular languages closed under $MIRROR$? In other words, is it true that $MIRROR(L)$ is regular for *every* regular language L? Prove your answer is correct.

2. Suppose you are given a description of a regular language. (The description might be a regular expression or the description of a finite automaton that accepts the language.) Describe an algorithm that determines whether it is true that every string in the language has even length.