This is a short assignment in part so you can spend time reviewing for Exam 1. Try the practice problems! (Don't just read the solutions.)

For each of the following languages, indicate whether the language is regular or not and (succinctly) prove your answer.

To prove a language is regular, you can use closure properties, give a regular expression for the language, or construct a finite automaton that accepts it.

To prove a language is non-regular, you can use the Pumping Lemma and/or closure properties.

Problem 1

$L = \{uv \mid u \in L_1, v \in L_1^R\}$, where $L_1$ is a regular language.

Problem 2

$L = \{a^i b^j a^k \mid 0 < i, 0 < j < k\}$

Problem 3

$L = \{uww^R v \mid u, v, w \in \{a, b\}^+\}$

Figure 1: A subtle hint to be careful answering Problem 3