Cpt S 317 Homework #2

Please print your name!

1. Let L be a regular language. Define $End(L, a) = \{x : x \in L$ and x is ended with symbol $a\}$. Show that $End(L, a)$ is a regular language.

2. Assume that L is

$$((aa + bbb)^*c)^*.$$

What is a regular expression for language $End(L, a)$?

3. For a word x, we use x^r to denote its reverse (e.g., the reverse of abaac is caaba). For a language L, we use L^r to denote $\{x^r : x \in L\}$. Show that if L is regular then so is L^r.

4. Assume that L is

$$((aa + bbb)^*c)^*bc.$$

What is a regular expression for language L^r?

5. Let L be a regular language defined by the following regular expression:

$$((aa + bbb)^* + ca)a^*(b + c).$$

List all the shortest words in L.

6. Describe an algorithm that finds all shortest words in a regular language defined by a regular expression r.