Cpts 317 - Homework #2

1. End $(L, a) = \{x, x \in L$ and x is ended with $a\}$

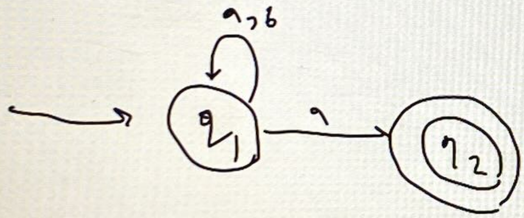
$a^* a$

is $\{a, aa, aaa, aaaa, \ldots\}$

then another set of inputs being b

$\{a, ba, aa, aba, baa \ldots\}$ we can define it as

$b^* a^* a$



Nfa

a, aa, aaa...

ba, aba, abbba, bbba, ...

This would mean that End(L, a) is a regular language.

2.

$L = \{ab\}$

$L = \{a \mid b\}$

$L = \{ab^n \; n > 3\}$

$RE = ab^3$

Regular expression

$RE = (a+b)^* \cdot c$

L is given as $((aa+bbb)^* c)^*$

$RE = La$

$RE = La = ((aa+bbb)^* c)^* a$

Regular expression for $End(L, a) = ((aa+bbb)^* c)^* a$

3. We can consider the closure properties of regular languages to simple set operations

First through union:

$$(L1 \cup L2)^R = L1^R \cup L2^R; \ (L1L2)^R = L2^R L_1^R; \ (L1^*)^R = (L1^R).$$

$$E = F^R. \text{ Then } E^R = (F,^R)$$

In this case we would use x^R for the reversal of word $x \in L(E)$, each x_N^R is in $L(F)$. The reversal of a string in $L(F^*)$ which would be $L(E)$.

4. $L = ((aa + bbb)^* c)^* bc$

$L^r = 2$

$r^r = cb\,(c\,(bbb + aa)^*)^*$

5. $L = ((a\,a + bbb)^* + (a)a^*(b+c)$

Shortest words in L are $\{b, c\}$

6.