Supervised Work 4: Regular Expressions

Exercise 1

Consider the alphabet L={a,b}.

Provide the regular expressions corresponding to the following properties:

1. Words that contain no b.
2. Words that do not contain "ab"
3. Words that contain at least one "a"
4. Words of even length.
5. Consider the alphabet X={0,1}. Provide the regular expression for binary numbers greater than or equal to 8.

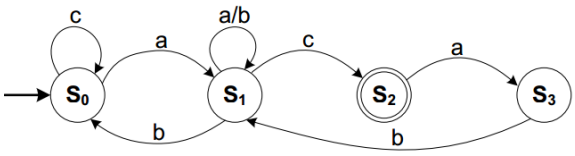
Exercise 2

Construct the deterministic finite state automata (DFA) accepting the following languages:

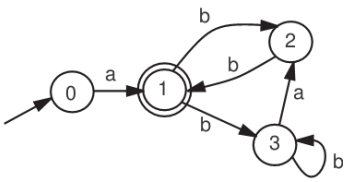
- (A +b)*c
- (a+b)*ab (a+b)*
- ((a*bc*)*acb*)*
- (1.1*.0.0*.1)*.0.1*

Exercise 3

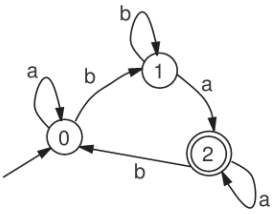
Determine the regular expression denoting the languages L(A), L(B), and L(C) for the following automata A, B, and C:



A



B



C

Exercise 4

For each of the following regular expressions, construct a finite automaton that recognizes the same language.

1. a* + (bb)*
2. (bba)*(a+b)*+b*
3. (b+ab)*(ε+a)
4. (b*+a)* aa
5. ((ab)* ab (aa+b)*)

Exercise 5

Are the following languages regular? Justify your answers.

- L1= $\{a^n b^m, n \geq 0, m>0\}$;
- L2= $\{a^n b^p, n \geq p\}$;
- L3= $\{(ab)^n c^m (be)^{n+m}$ avec $n,m \geq 0\}$.