Norwegian University of Science
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MA0301 Elementary discrete mathematics Spring 2017

Exercise set 10

1 Homework Set 10

1 Let $\Sigma := \{a, b, c, d\}$ be an alphabet. Find regular languages corresponding to the following regular expressions. Note, if the set is infinite, then list the first ten elements.

a) $a(b \vee c \vee d)a$

b) $a^*b^*c^*$

c) $a(bc)^*d$

2 Let $\Sigma := \{a, b, c, d\}$ be an alphabet. Find regular expressions that correspond to the following regular languages.

a) $\{ab, ac, ad\}$

b) $\{ab, ac, bb, bc\}$

c) $\{a, ab, abb, abbb, abbb, \ldots\}$

3 Let $\Sigma := \{a, b, c\}$ be an alphabet.

a) Give a regular expression for the language $L_1 \subset A^*$ where all elements have exactly two b's.

b) Give a regular expression for the language $L_2 \subset A^*$ where all elements have exactly two b's and two c's.

c) Give a regular expression for the language $L_3 \subset A^*$ where all elements have have one or more a's, followed by one or more b's and then one or more c's.

4 a) Draw the state diagram $D(M)$ of the automaton M with states $S := \{s_0, s_1, s_2\}$, accepting states $Y := \{s_1\}$, input alphabet $I := \{a, b\}$, described in the state table $T(M)$:

	ν	
	a	b
s_0	s_0	s_1
s_1	s_0	s_2
s_2	s_2	s_2

b) Write a regular expression for the language accepted by M.

5 Find an automaton M that accepts the regular language given by the regular expression $(a^*(ba)^*bb^*a)^*$.