Formale Systeme Proseminar

Tasks for Week 14, 24.1.2019

Task 1 Prove that the following language L is at least countable, i.e., that $|L| \geq \aleph_0$ where

$$L = \{w \in \{0,1\}^* \mid w \text{ begins with a 1 and ends with a 0}\}.$$

Task 2 Prove that the following language L is at least countable, i.e., that $|L| \geq \aleph_0$ where

$$L = \{w \in \{0,1\}^* \mid \text{the number of 1's in } w \text{ equals two}\}.$$

Task 3 Construct a DFA for the language

$$L = \{w \in \{0,1\}^* \mid w \text{ begins with a 1 and ends with a 0}\}.$$

Task 4 Construct a DFA for the language

$$L = \{w \in \{a,b\}^* \mid \text{ every } a \text{ in } w \text{ is preceeded and followed by a } b\}.$$

Task 5 Construct a DFA for the language

$$L = \{w \in \{0,1,2,3,4,5,6,7,8,9\}^* \mid w \text{ as a natural number is divisible by 3}\}.$$

Hint: A natural number is divisible by 3 iff the sum of its digits is divisible by 3.

Task 6 Construct a DFA for the language

$$L = \{w \in \{0,1\}^* \mid w \text{ ends with 11 or with 101}\}.$$