

Exercises week 3

Languages and Automata

May 10, 2012

3. Regular languages, Finite Automata

Let $\Sigma = \{a, b\}$.

- 3.1. 1. Construct a DFA M_1 such that

$$L(M) = L_1 = \{w \in \Sigma^* \mid \#_a(w) \text{ is divisible by } 3\}.$$

2. Construct an M_2 such that

$$L(M) = L_2 = \{w \in \Sigma^* \mid \#_b(w) \text{ is divisible by } 2\}.$$

3. Construct a NFA $_{\lambda}$ M_3 such that $L(M_3) = L_1 \cup L_2$.

4. Construct a DFA M_4 such that $L(M_4) = L_1 \cup L_2$.

- 3.2. Construct a regular expression e such that

$$L(e) = L = \{w \in \Sigma^* \mid \text{'abba' does not occur in } w\}.$$

We do this in several steps

1. First find an NFA $_{\lambda}$ M such that its language is \bar{L} .
2. Then construct a DFA M' accepting the same language.
3. Modify M' to obtain M'' accepting L .
4. Find e such that $L(e) = L(M'')$.