Recap part I: Regular Languages

H. Geuvers and T. van Laarhoven

Institute for Computing and Information Sciences – Intelligent Systems
Radboud University Nijmegen

Version: fall 2014
Today:

- Hour 1: recap of part I of FLGA
- Hour 2: discussion of assignment 4
- Hours 3-4 (start at 10:30!): half-way test-exam on part I
- Locations for the test-exam:
  - HG00.310 (students [A–G])
  - HG00.206 (students [H–R])
  - HG00.065 (students [S–W])
Typical questions (1)

Consider \( L = \{ w \mid |w|_b \geq 1 \} \).

- Give a DFA accepting \( L \).
- Is it the case that \( L^* = L \)?

Consider also \( L' = L((a + b)^*(ab^*b + b)aa^*) \).

- Do we have \( L' = L \)? \( L' \subseteq L \)? \( L \subseteq L' \)?
- Give an NFA \( M \) accepting \( L' \).
- Determinize \( M \) to get a DFA accepting \( L' \).

Consider

\[
\begin{align*}
L_1 & = \{ w \mid |w|_b \text{ is odd} \} \\
L_2 & = \{ w \mid |w|_b \text{ is even} \}
\end{align*}
\]

- Do we have \( L_1L_2 = L_2L_1 \)?
- Do we have \( L_1L_1 = L_2 \)?
Typical questions (2)

(From LnA) Consider the following NFA $M$

What is the length of the shortest accepted word?

Compute $\delta^*(q_1, ab)$.

Compute $\delta^*(q_0, abab)$.

Do we have $L(aa^*b) \subset L(M)$?

What is the language accepted by $M$?

Give a regular expression $e$ such that $L(e) = L(M)$. 
Typical questions (2)

(From LnA) Consider the following NFA $M$

- What is the $\lambda$-closure of $q_0$?
- Compute $\delta^*(q_0, a)$, $\delta^*(q_0, aa)$, and $\delta^*(q_0, aba)$.
- Give a regular expression $e$ such that $L(e) = L(M)$.
- Compute a DFA that accepts the same language as $M$. 