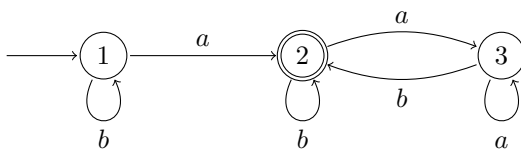


Solved exercises must be marked and solutions (as a single PDF file) uploaded in [OLAT](#). The (strict) deadline is 7 am on November 7.

Exercises

- (2) 1. Which of the following sets over $\Sigma = \{a, b\}$ are regular and which are not? Provide justification.
- (a) $\{xax \mid x \in \{a\}^*\}$
 - (b) $\{xax \mid x \in \Sigma^*\}$
- (2) 2. Give WMSO formulas that define the following regular sets over $\Sigma = \{a, b, c\}$.
- (a) $\{axbc \mid x \in \Sigma^*\}$
 - (b) $\Sigma^* - L(a^*b^*)$
- (3) 3. Which of the following subsets of $\{a, b\}^*$ are regular and which are not? Provide justification.
- (a) $A = \{x \mid \#a(x) = 2 \cdot \#b(x)\}$
 - (b) $B = \{x \mid \#a(x) - \#b(x) < 10\}$
 - (c) $C = \{x \mid \#a(x) \cdot \#b(x) \text{ is even}\}$
- (1) 4. Consider the following DFA M :



Construct a WMSO formula φ such that $L(\varphi) = L(M)$.

- (2) 5. Consider the regular expression $\alpha = (a + b)(a + b)^*a$.
- (a) Compute the minimum-state DFA M for $L(\alpha)$.
 - (b) Give a regular expression for each of the equivalence classes of the Myhill–Nerode relation $\equiv_M$ of M .