



Computation and Discrete Structures III
Group 1 Semester 2026-2 12 Feb 2026

Quiz #1

Name: _____

Student ID: _____ A

P.1. (50%) Let $\Sigma = \{0, 1, 2\}$ and consider the language

$$L = \{w \in \Sigma^* \mid w \text{ has length exactly 2 and ends with } 2\}.$$

- a) List all strings in L .
- b) Write five different strings in Σ^* that are not in L (explain why). Does $\varepsilon \in L$?
- c) Is L finite or infinite? Justify briefly using the definition of Σ^* .

P.2. (50%) Let $\Sigma = \{a, b\}$ and $L = \{ab, ba\}$.

- a) Compute explicitly L^2 and L^3 (write all strings, without repetitions).
- b) For each of the following strings, indicate whether it belongs to L^2 , L^3 , L^4 , or to none of these:

$$abab, \quad abba, \quad baab, \quad ababab, \quad baabba.$$

Justify each answer by expressing the string (or not) as a concatenation of elements of L .

- c) Can the string $w = (ab)^4$ belong to L^3 ? Explain why or why not.



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Quiz #1

Name: _____

Student ID: _____ B

P.1. (50%) Let $\Sigma = \{a, b, c\}$ and consider the language

$$L = \{w \in \Sigma^* \mid w \text{ starts with } a \text{ and has length at most 3}\}.$$

- a) List all strings in L .
- b) Give three different strings in Σ^* that do not belong to L , and explain why. Does $\varepsilon \in L$?
- c) Is ε in L ? Is ε in Σ^* ? Justify both answers.

P.2. (50%) Let $\Sigma = \{0, 1\}$ and $L = \{01, 10, 11\}$.

- a) Compute explicitly L^2 (all concatenations of two strings from L).
- b) For each of the following strings, determine whether it belongs to L^2 , L^3 , or to none of them. Show a factorization when it belongs.

$$0110, \quad 1110, \quad 1011, \quad 010110, \quad 111111.$$

- c) Is it possible for a string of odd length to be in L^4 ? Explain your reasoning.