KUTAISI INTERNATIONAL UNIVERSITY

Exercises for TTF

Introduction to Theory of Computation
Summer semester 2025

Exercises below are your homework; after submission, they will also be discussed during exercise classes.

Week one

1. Find a deterministic finite automaton accepting all strings in $\{0,1\}^*$ such that every 0 has a 1 immediately to its right.
2. Show: if L is regular, then its complement $\overline{L}$ is regular.
3. Show: if L is finite, then it is regular.
4. Draw a deterministic automaton M, which accepts the language
$$L = \{1^i \ : \ i \equiv 0 \bmod 3\} \cup \{1^i \ : \ i \equiv 0 \bmod 5\}.$$
5. if M_1 accepts L_1 and M_2 accepts L_2, describe DFA M which accepts $L_1 \cup L_2$.
6. *(From 2024 Midterm)* Write down a regular expression that generates language L over alphabet $\{0,1\}$ consisting of strings which contain exactly two or exactly three 1's. Explain. You can use parenthesis in your regular expressions.